

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELANTS: P. Dubbert et al.

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EXAMINER: Chin Shue, Alvin C.

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APPEAL BRIEF (37 CFR 41.37)

This brief is in furtherance of the Notice of Appeal filed in this case on July 18, 2008.

The fees required under § 41.20(b)(2) and any required petition for extension of time for filing this brief and fees therefore are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains these items under the following headings and in the order set forth below (37 CFR 41.37 and MPEP 1208):

- I. REAL PARTY IN INTEREST
- II. RELATED APPEALS AND INTERFERENCES
- III. STATUS OF CLAIMS
- IV. STATUS OF AMENDMENTS
- V. SUMMARY OF CLAIMED SUBJECT MATTER
- VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL
- VII. ARGUMENT: REJECTIONS UNDER 35 U.S.C. §103
- VIII. CLAIMS APPENDIX
- IX. EVIDENCE APPENDIX
- X. RELATED PROCEEDINGS APPENDIX

I hereby certify that this correspondence is being transmitted via EFS-WEB to the United States Patent and Trademark Office on the date below

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October 17, 2008
Date of Signature

I. REAL PARTY IN INTEREST (37 C.F.R. 41.37 (c)(1)(i))

The real party in interest in this appeal is Kirchner Block and Brick, Inc., a Missouri Corporation, the assignee of the present application. Kirchner Block and Brick, Inc., is a wholly owned subsidiary of Midwest Products Group, Inc., a Missouri Corporation. The inventors are obligated to assign all rights in the patent application to Kirchner Block and Brick, Inc.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. 41.37 (c)(1)(ii))

With respect to other appeals or interferences that will directly affect, or be directly affected by, or having a bearing on the Board's decision in this appeal:

- A. [] there are no such appeals or interferences.
- B. [] there are as follows:

III. STATUS OF CLAIMS (37 CFR 41.37 (c)(1)(iii))

The status of the claims in this application are as follows:

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: **21**

B. STATUS OF ALL THE CLAIMS

(If there are no claims in a category indicated: NONE)

1. Claims cancelled: **7 and 13-15**
2. Claims withdrawn from consideration but not cancelled: **1-6, 8-12, and 19-21**
3. Claims pending: **1-6, 8-12, and 16-21**
4. Claims allowed: **None**
5. Claims rejected: **16-18**

C. CLAIMS ON APPEAL

The claims on appeal are: **16-18**

IV. STATUS OF AMENDMENTS (37 CFR 41.37 (c)(1)(iv))

There are presently no pending unentered amendments in the above identified application.

V. SUMMARY CLAIMED SUBJECT MATTER (37 CFR 41.37 (c)(1)(v))

16. An attachment assembly (76) for securing an upright (16) of a scaffolding system (10) to a retaining wall (12) comprised of a plurality of retaining wall blocks (13); the attachment assembly (76) comprising: (p. 16 ¶ [0053], Figs. 1 and 17-19)

a standoff bracket (67) mountable to said upright (16); said standoff bracket assembly (67) comprising a base (68) adapted to be secured to said upright (16), a standoff leg (72) extending from said base (68) and an attachment dowel (74) extending from said base (68); said leg (72) engaging the retaining wall (12) in use to maintain the frame a determined distance from the wall (12); (p. 11 ¶ [0042], Figs. 12A-12B)

a flexible attachment strap (102) having a first end (102a) and a second end (102b) and being of a length sufficient to pass through said wall (12); an eyelet (104) in said first end (102a) sized and shaped to fit over said standoff assembly (67) attachment dowel (74); said attachment strap (102) including a slot (106) at its said second end (102b); (p. 14 ¶ [0050], Figs. 1 and 17-19D)

a retainer (110, 110'); said retainer (110, 110') comprising a body (112) comprising a top surface (114), a bottom surface (116), a block engaging surface (120) adapted to engage said retaining wall (12) during use, and an opening (122) in said block engaging surface (120); said retainer body (112) opening being sized to allow said attachment strap (102) to pass therethrough; said retainer (110, 110') further including a wedge (140) which is sized and shaped to be received in said attachment strap slot (102); said wedge (140) having a first side edge (Figs.

17-20) which engages a surface (130, 131, 154) of said retainer (110, 110') and a second side edge (Figs. 17-20) which engages a surface (Figs. 17-20) of said attachment strap slot (106) distal from said retainer surface (130) to urge said retainer (110, 110') against said retaining wall (12); said retainer (110, 110') cooperating with said attachment strap (102) to pull said stand-off assembly (67) toward said retainer (110, 110'), thereby urging a surface (130) of said retainer (110) and said stand-off (67) against opposite sides of said retaining wall (12) to secure the frame (Fig. 1) in position relative to the retaining wall (12). (p. 16 ¶ [0053], Figs. 17-19D)

17. The attachment assembly (76) of claim 16 wherein said retainer body (112) is generally elongate and comprises a back surface (126) spaced from said block engaging surface (120) by said top (114) and bottom surfaces (116); an opening (122) in said back surface (126) sized to allow said strap (102) to pass therethrough; and aligned slots (128) in said upper (114) and lower surfaces (116) of said retainer (110); said wedge (140) passing through said slots (128) and engaging a forward surface (130, 131) of said slots (128). (p. 14-15 ¶ [0051], Figs. 19-19D)

18. The attachment assembly of claim 17 wherein said retainer body slot forward surfaces (130, 131) are sloped; the slope of the slot surfaces (130, 131) corresponding generally to the slope of the wedge edges (Figs. 17-20). (p. 15 ¶ [0052], Figs. 19-19D)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 CFR 41.37 (c)(1)(vi))

The following grounds of rejection are requested to be reviewed on appeal:

A. The Examiner's conclusion that Claims 16-18 are obvious under 35 U.S.C. §103 over U.S. Pat. No. 4,850,453 issued to *St-Germain* (hereafter referred to as "*St-Germain*") in

view of U.S. Pat. No. 3,690,613 issued to *Shoemaker* (hereafter referred to as “*Shoemaker*”), and U.S. Pat. No. 3,741,516 issued to *Rugger* (hereafter referred to as “*Rugger*”).

B. The Examiner’s restriction of Claims 1-6, 8-12 and 19-21.

VII. ARGUMENTS - REJECTIONS UNDER 35 U.S.C. § 103 (CFR 1.192(c)(8)(iv))

A. Introduction and Overview

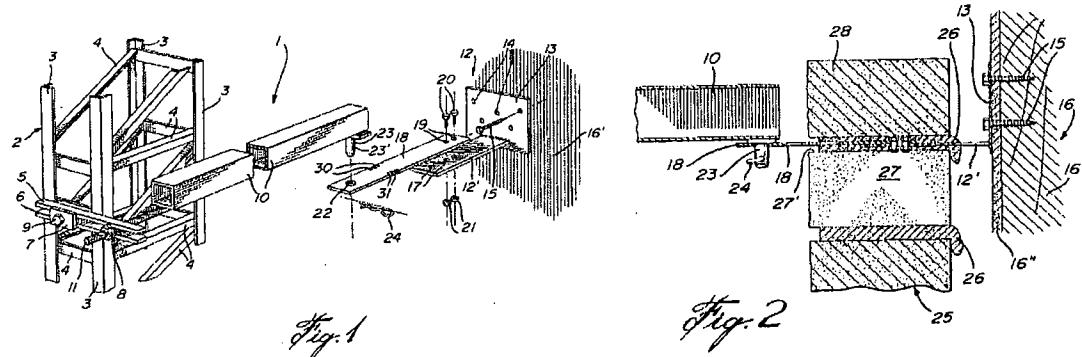
The Examiner rejected Claims 16-18 under 35 U.S.C. §103(a) as being unpatentable over *St-Germain* in view of *Shoemaker* and *Rugger*. Applicants respectfully disagree with the Examiner’s conclusion and suggests that the Examiner has improperly constructed a rejection with hindsight based merely on the road map provided by Applicants’ specification. In addition, the Examiner has failed to provide a proper rational as to why a person of ordinary skill in the art would have combined the references in the manner claimed. Furthermore, the Examiner’s proposed combination and modification of the cited references would make the prior art inventions inoperable and would change the principle of operation of the prior art inventions.

B. Discussion of the References

1. U.S. Pub. No. 4,850,453 to *St-Germain*.

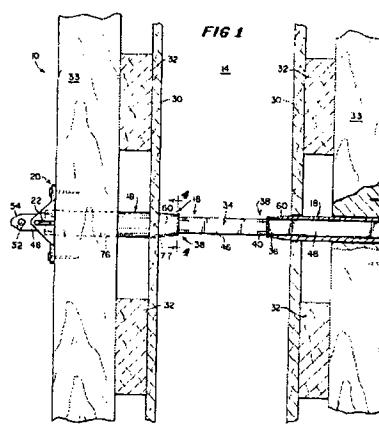
As best understood, *St-Germain* discloses a scaffolding attachment (1), as best seen in FIGS. 1-2 which is reproduced below, having an elongated threaded rod (11) which is secured to the scaffolding by means of the flat bars (5 and 6) and a pair of nuts (8) (only one of which is shown). An rigid elongate beam (10) is welded or otherwise secured to the rod (11). The beam (10) is connected to a rigid link (18) by means of a peg (23) which extends from the beam (10) through an opening (22) in the link (18). The link (18), in turn, is mounted to a plate (12') of a bracket (12) which is fixed to a wall (16). As seen, the bracket (12) secured to the side (16') of

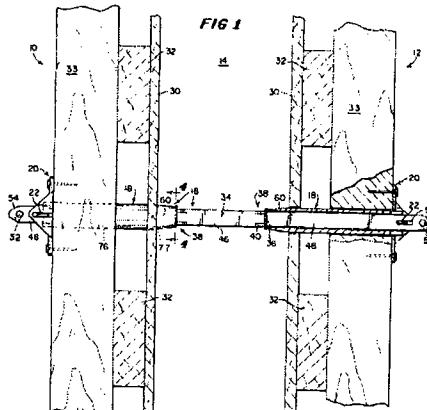
the wall (16) adjacent the scaffolding. (*St-Germain* 3: 2-40). As can be appreciated, to maintain the scaffolding fixed in place relative to the wall 16, the rod 11, beam 10, link 18, and plate 12' all bear both compressive and tensile forces.



2. U.S. Pat. No. 3,690,613 to Shoemaker.

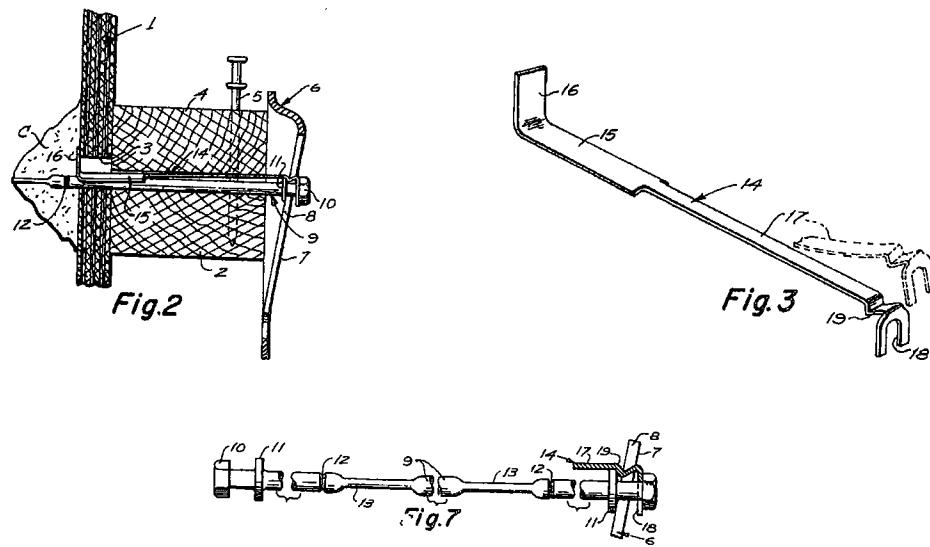
Shoemaker discloses a rod securing means for maintaining the sides of a concrete wall form (14) in place relative to each other during pouring into the form and setting of the concrete poured into the form. As seen in FIG. 1, which is reproduced below, *Shoemaker* provides a rigid tie rod (34) which extends through the opposite sides (10 and 12) of a concrete form (14). (*Shoemaker* 4: 29-41; 7:14-61). Sleeve cones (18) pass through each side of the concrete form (14), and the tie rod (34) passes through the sleeve cones (18). *Id.* Backing plates (20) are secured to the outside (back sides) of each of the sides (10 and 12) of the form (14). *Id.* The tie rod (34) passes through the plates (20). *Id.* Wedges (22) are provided which pass through slots (50) in the opposite ends of the tie rod (34), slots (80) in upturned corners of the plate (20), and slots (64) in the cone sleeve (18). *Id.*





3. U.S. Pat. No. 3,741,516 to *Rugger*.

Rugger discloses another concrete form securing means comprising a rigid tie rod (9) extending between a pair of forms and secured by a wedge members (6) and heads (10). (*Rugger* 2:40-66). A bendable tie strap (14) engages each end of the tie rod (9) and in conjunction with the wedge members (6) holds the form parts in a fixed relation relative to each other. (*Rugger* 3:44-47, 54-58). FIGS. 2, 3, and 7 of *Rugger* are reproduced below:



C. Requirements For A *Prima Facie* Case Of Obviousness

As the Federal Circuit has admonished, “virtually all [inventions] are combinations of old elements.” *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332 (Fed. Cir. 2005). Here, the Examiner apparently has attempted to find every individual element of the claimed invention in the prior art. However, “The mere fact that elements of [an invention] may be found in various [references] does not necessarily negate invention.” *In re McKenna*, 40 C.C.P.A. 937, 203 F.2d 717, 721, 97 U.S.P.Q. (BNA) 348, 351 (CCPA 1953). “Impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts

gleaned from the prior art.” MPEP § 2142. The recent *KSR* decision has not altered these requirements.¹

As outlined in the Examination Guidelines of Federal Register, Vol. 72, No. 195, p. 57534 (October 10, 2007) and substantially adopted as MPEP §2141 (Rev. 6, 2007), the Supreme Court in the *KSR* decision reaffirmed the framework for determining obviousness under 35 U.S.C. §103(a) as set forth in *Graham v. John Deere Co.*² Under the *Graham* decision, this framework includes:

- (a) ascertaining the scope and contents of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue; and
- (c) resolving the level of ordinary skill in the pertinent art.³

As noted in the Examination Guidelines, the *KSR* Court “recognized that a showing of ‘teaching, suggestion, or motivation’ to combine prior art to meet the claimed subject matter could provide a helpful insight in determining whether the claimed subject matter is obvious under 35 U.S.C. 103(a).”⁴ As further outlined in MPEP §2141, the *KSR* Court noted that the “analysis supporting a rejection under 35 U.S.C. § 103(a) should be made explicit and that it is ‘important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] element’” in the manner claimed. The Court specifically stated:

“it will often be necessary to look to interrelated teachings of multiple patents; to the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art.

¹ See *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 82 USPQ2d 1385 (2007).

² See 383 U.S. 1 (1966).

³ See *Graham v. John Deere*, 383 U.S. 1, 17-18 (1966).

⁴ Federal Register, Vol. 72, No. 195, p. 57534 (October 10, 2007)(emphasis added).

To facilitate review, this analysis should be made explicit.” *KSR*, at 1731.

MPEP §2141 concludes in its analysis of the *KSR* decision that “in formulating a rejection under 35 U.S.C. §103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed”. As the Federal Circuit has found, “a flexible TSM test remains the primary guarantor against a non-statutory hindsight analysis.” *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008) (citing *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007)(“[A]s the Supreme Court suggests, a flexible approach to the TSM test prevents hindsight and focuses on evidence before the time of the invention.”)). The *Ortho* court states that the “TSM test, flexibly applied, merely assures that the obviousness test proceeds on the basis of evidence – teachings, suggestions (a tellingly broad term), or motivations (an equally broad term) that arise before the time of the invention as the statute requires.” *Id.*

35 U.S.C §103(a) still requires that “[a] patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.”(emphasis added). Applicants respectively suggest that the Examiner has disregarded the “subject matter as a whole” language of the statute. Nothing in the art of record shows describes or even vaguely intimates the “subject matter as a whole” of Applicants’ structural combination set forth in the claims 16-18. Rather, apparently using Applicants’ specification as a guide, the Examiner has improperly

constructed the rejection element by element. Furthermore, under this improper construction, the Examiner's rejections are silent as to why a person of ordinary skill in the art would have combined the references as the manner claimed.

D. Claims 16-18 Are Patentable Over The *St-Germain*, *Shoemaker*, and *Rugger* Patents.

In his rejection of Claims 16-18, the Examiner asserts that *St-Germain* shows standoff bracket (Fig. 1; 5-9), a standoff leg (10), and a dowel (23). The Examiner admits that *St-Germain* does not disclose an attachment strap or a retainer body. (6/18/07 Office Action, pg. 2; and 3/03/08 Office Action, pg. 2-3). Instead, the Examiner cites *Shoemaker* as teaching an attachment strap (Fig. 1; 34) with an eyelet (22), a retainer body (20) with slotted walls (78), and a wedge (22). *Id.* Furthermore, the Examiner cites *Rugger* as showing an attachment strap made from a flexible material. *Id.* Without providing any proper rationale, the Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the scaffolding attachment of *St-Germain* to have the attachment strap (34) and body (20) as taught by *Shoemaker*. *Id.* Moreover, the Examiner asserts that it would have been obvious in light of *Rugger* for the attachment strap to be made of a flexible material. *Id.* Further, the Examiner contends that it would have been an "obvious engineering expediency" to slope the surface of the slots to correspond to the slope of the wedge without providing any evidentiary support. *Id.* Applicants respectfully disagree with the Examiner's combination of *St-Germain*, *Shoemaker*, and *Rugger*.

A look at the cited references clearly shows that it would not have been obvious to combine *St-Germain*, *Shoemaker*, and *Rugger*. To start, neither *St. Germain*, *Shoemaker*, nor *Rugger* teach, suggest or, disclose the use of either a flexible attachment strap or a standoff as set

forth in Claim 16. In addition, the cited references do not contain any suggestion to combine the elements cited by the Examiner, but instead teach away from such a combination. *See Ted Air, Inc. v. Denso Manufacturing Michigan, Inc.*, 192 F.3d 1353 (Fed. Cir. 1999) (“There is no suggestion to combine ... if a reference teaches away from its combination with another source ...”.)

Specifically, nothing in *Shoemaker* discloses or suggests a flexible attachment strap. Rather, *Shoemaker* teaches that a rigid tie rod is required to handle compression forces, stating, “In this connection, the tie rod must be strong enough to assimilate the large stresses which are imposed upon it during pouring of wet concrete...” (*Shoemaker* 1:47-51).

Similarly, *Rugger* shows a rigid tie rod and tie strap that must handle compression forces. *Rugger* states, “The tie rods and the tie straps 14 in conjunction with the wedge hold the plywood panels in predetermined fixed relation ready to receive concrete.” (*Rugger* 3:44-46). Although not expressly stated by the Examiner, it appears that the Examiner erroneously equates tie strap (14) with the claimed flexible attachment strap. (3/03/08 Office Action, pg. 2). The specification of *Rugger* discloses the tie strap (14) is “formed of spring steel” so that it “may be bent elastically as indicated by dotted lines in Fig. 3”. Clearly, a stiff but ductile spring steel that is required to handle compression forces does not equate to the claimed flexible attachment strap. Applicants’ specification is not consistent with such an interpretation of the term “flexible”, which states “The strap 102 is preferably formed from a material so that it will be flexible. A preferred material is a plastic, such as nylon.” (Application, ¶0050). The specification also teaches away from the use of metal for the strap, stating, “A metal strap will rust, and the rust

will stain the wall 12." (Application, ¶0056). A plastic material, such as nylon, can not support the compression forces disclosed in either *Rugger* or *Shoemaker*.

As submitted in Applicants' remarks from the Amendment filed December 14, 2007, if the tube (10) or rigid link (18) of *St-Germain* were replaced with a flexible strap, the scaffolding of *St-Germain* would become inoperative and would change the principle of its operation.⁵ The replacement of these rigid members with a flexible member would allow for the scaffolding of *St-Germain* to move relative to the bracket (12) and wall (16). Applicants' attachment system avoids this problem by passing the strap through the wall, and then pulling the strap taut with the retainer. (Application, ¶0053). As can be appreciated, this pulls the standoff and the retainer against opposite sides of the wall to secure the frame of the fall protection system in place relative to the wall. *Id.* However, in response to Applicants' remarks from the Amendment filed December 14, 2007 the Examiner stated:

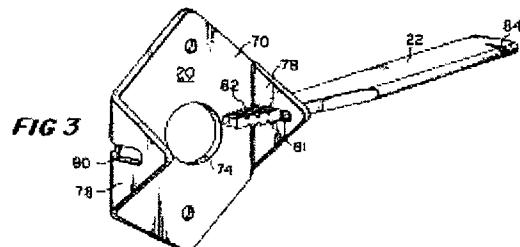
"Applicant's arguments filed 12/14/07 have been fully considered but they are deemed not persuasive. Applicant argues that to use a flexible strap with the standoff bracket of St. Germain would be inoperative, the examiner disagrees, the flexible strap is capable of being attached to the dowel of St. Germain and further be capable of being passed through a wall. With respect to Claim 18, note the body of the rejection above."

In light of this statement, it appears the Examiner did not fully comprehend Applicants' remarks. What Applicants were asserting in the arguments filed 12/14/07 was that the Examiner's proposed modification to *St-Germain* (i.e., replacement of the rigid beam (10) and the rigid link member (18) with a flexible member) would render the device of *St-Germain* inoperable and would change the principle of operation. Specifically, *St-Germain* only discloses

⁵ MPEP § 2143.01, "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

the use of the rigid beam (10), rigid link (18), and rigid plate 12' to connect the scaffolding to the wall (16). As seen in FIGS. 1-2 of *St-Germain*, the rigid plate (21') is secured to the surface of the wall (16) adjacent to the scaffolding. None of the beam, link or plate which secure the scaffolding in place relative to the wall (16) pass through the wall (16). If this rigid connection between the scaffolding and wall (16) were replaced with a flexible member, as suggested by the Examiner, the scaffolding would become unstable. Unstable scaffolding is dangerous, and hence unusable (or inoperative). Because *St-Germain* does not teach any other method to stabilize the scaffolding (such as the use of a separate standoff assembly extending between the scaffolding and the wall as set forth in the claims of this application), the modification suggested by the Examiner renders the *St-Germain* scaffolding inoperative.

Furthermore, with respect to Claim 18, none of the references teach or suggest that the slot in the retainer body (which is aligned with the attachment strap slot) has a sloped surface, and that the slope of this surface corresponds to the slope of the wedge. While the wedge bolt (22) of *Shoemaker* does have a sloped surface, the slots (80) in the plate (20) through which the wedge bolt passes are both of equal size, as seen in FIG. 3, which is reproduced at the right. As seen, the slots (80) of *Shoemaker*'s plate (20) do not define a sloped surface.



In the Office Action of June 18, 2007, the Examiner rejected Claims 16-18 under 35 U.S.C. §103 as being unpatentable over *St-Germain* in view of *Shoemaker*. In response to Applicants' Reply of September 18, 2007, the Examiner entered the present rejection. Hence, by

now rejecting Claims 16-18 over *St-Germain* in view of *Shoemaker* and *Rugger*, the Examiner has essentially conceded that *St-Germain* and *Shoemaker* do not make the Claims 16-18 obvious.

As set forth in the September 18, 2007 response at page 13, “neither *St-Germain* nor *Shoemaker* disclose the use of a flexible strap or standoff as currently set forth in Claim 16.” The Examiner now asserts that *Rugger* discloses that missing flexible strap. But all the Examiner appears to do is replace the rigid link of *St-Germain* with the flexible strap as discussed above, which would render the *St-Germain* scaffolding inoperative.

Also, the Examiner asserts that it would have been an “obvious engineering design expediency” to slope the surface of the slots to correspond to the slope of the wedge. However, this assertion lacks any evidentiary support because none of the cited references disclose, teach, or suggest the surface of the slots corresponding to the slope of the wedge. Rather, the Examiner relies on his own personal knowledge and the general knowledge in the prior art to support his obviousness rejection. The Examiner’s ability to use such personal and general knowledge is subject to 37 CFR §1.104(d)(2), which states:

“When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible, and the reference must be supported, when called for by the applicant, by an affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons.” See 37 CFR §1.104(d)(2).

Even after Applicants’ request under 37 CFR §1.104(d), the Examiner did not provide an affidavit in conformance with §1.104(d)(2). As expressly recognized in MPEP 2144.03, “It is never appropriate to rely solely on ‘common knowledge’ in the art without evidentiary support in the record, as the principle evidence upon which a rejection was based.” Applicants point out

that general skill in the art will rarely operate to supply missing knowledge or prior art to reach an obviousness judgment. As stated by the Federal Circuit:

“To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” *See W.L. Gore & Assocs. V. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984); *In re Sang Su Lee*, 277 F.3d 1338, 1344 (Fed. Cir. 2002).

As noted above, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. *See KSR* at 1731. Here, the Examiner has failed to provide a rationale for combining the cited references. To support the conclusion that the claimed invention is directed to obvious subject matter “the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” MPEP §706.02(j), citing *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

The Examiner’s only explanation for combining the references is to simply identify the purpose of the element. For example, the Examiner’s stated rationale for providing the attachment member of *St-Germain* with flexible material of *Rugger* is “to enable a flexible attachment member that is capable of being used with his standoff bracket and being capable of attaching to the wall”. (3/03/08 Office Action, pg. 2). However, these statements merely identify the purpose of each individual elements. They do not illustrate a suggestion, teaching, or motivation to combine the elements.

Further, Applicants respectfully submit that the Examiner is not using the correct standard in determining making the proposed combination. The Examiner is using an “if the modification

can be made" standard. The correct standard is if the proposed modification would be *obvious* to one of skill in the art. 35 U.S.C. 103.⁶ As discussed above, the Examiner's proposed modification would replace a rigid member extending between the scaffolding and the wall surface adjacent the scaffolding with a flexible member. Because the flexible member will bend or flex under the compressive loads that will be applied during use, the scaffolding will be able to swing to and fro relative to the wall, rendering the scaffolding unstable, and thus dangerous to use. One skilled in the art would not make a modification that would render scaffolding unstable. Hence, the Examiner's proposed modification would not be obvious to one of skill in the art.

In view of the arguments above, Applicants respectfully submit that Claim 16 is allowable over both *St-Germain*, *Shoemaker*, and *Rugger* whether considered individually or in combination. Claims 17-18 depend from Claim 16 and hence incorporate all the elements of Claim 16. Claim 17-18 are thus believed to be allowable for the same reasons set forth above with respect to Claim 16. Applicants thus request that the Examiner's rejection of Claims 16-18 be reversed.

E. Related Canadian Patent No. 2,465,473

To aid the Board's analysis of this case, Applicants have attached related Canadian Patent Application 2,465,473 as Exhibit A, which claims priority to U.S. provisional application 60/465,954. As evidenced by attached Notice of Allowance (attached as Exhibit B), the Canadian patent application was allowed in light of Applicants' response of December 7, 2007 to

⁶ 35 USC 103 states that "a patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole *would have been obvious at the time the invention was made to a person having ordinary skill in the art* to which said subject matter pertains." (emphasis added).

an office action dated January 18, 2007. The Canadian Office action is attached as Exhibit C; and the response thereto is attached as Exhibit D. As set forth in the Canadian Office Action, the Canadian Examiner stated, "A search of the prior art, considering the above noted claims, has thus far failed to reveal any pertinent references." A comparison of Claims 1-17 in the response of December 7, 2007 show that Claims 12-14 are nearly identical to the claims 16-18 on appeal herein.

F. Restriction of 1-6, 8-12, and 19-21

Applicants respectfully traverse the restriction requirement for Claims 1-6, 8-12 and 19-21 and submit that the restriction requirement is not proper. In support of this, Applicants note that the second restriction requirement (issued on November 19, 2007) is nearly identical to the first restriction requirement (issued on March 8, 2007). In support of the present restriction requirement, the Examiner stated:

"Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require a strap fitting over a standoff dowel. The subcombination has separate utility such as an attachment for wedging a pair of wooden plank together."

Except for the underlined verbiage, this statement is identical to the statement made in support of the first restriction requirement. The underlined verbiage was not present in the justification for the original restriction requirement. In response to the first restriction requirement, Applicants elected Group II (Claims 13-19, as set forth in that restriction

requirement) and amended the claims. In response to the amendment filed with the restriction requirement, the Examiner withdrew only Claims 12 and 19.

In a telephone call with the Examiner, the Examiner asserted that the addition of new Claim 21 in the amendment filed September 18, 2007 effectively mooted the prior restriction requirement, thereby requiring entry of this new restriction requirement. Applicants, however, note that new Claim 21 is a dependent claim which depends from Claim 3 and sets forth features of the attachment assembly mounting portion and the gravity pin.

Applicants point out that Claim 1 is directed to a retaining wall fall protection system including an attachment assembly. Claim 16 (the other independent claim) is directed to the attachment assembly itself. The attachment assembly as set forth in Claim 1 includes all the elements as the attachment assembly as set forth in Claim 16. With respect to the Examiner's distinction (noted above), Applicants note that Claim 1 states that the "attachment strap [is] connected at said first end to said stand-off assembly". Claim 16, on the other hand provides the attachment strap includes "an eyelet in said first end sized and shaped to fit over said standoff assembly attachment dowel". Thus, Claim 16 defines the attachment strap more narrowly than Claim 1. Because Claim 16 includes the attachment assembly of Claim 1, Applicants respectfully assert that Claim 16 is not a subcombination of Claim 1.

Applicants respectfully request that the Board reverse the Examiner's restriction requirement of Claims 1-6, 8-12 and 19-21.

G. Conclusion

As discussed above, the references fail to disclose the noted elements of the claims, and hence, in accordance with the requirements of the MPEP, as set forth in Chapter 2100 the

references cannot make the claims obvious. Further, as noted above, in particular instances, the Examiner failed to make *prima facie* showings of obviousness or otherwise improperly interpreted or applied the disclosure of the cited patents.

As discussed above, Claims 16-18 are allowable over *St-Germain, Shoemaker*, and *Rugger*, whether considered individually or in combination. Applicants thus respectfully request that the Board reverse the Examiner's rejections of Claims 16-18. Also, Applicants respectfully request that the Board reverse the Examiner's restriction of Claims 1-6, 8-12 and 19-21.

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VIII. CLAIMS APPENDIX (37 CFR 41.37 (c)(1)(vii))

The text of the claims in the appeal are:

1. (Withdrawn) A retaining wall fall protection system comprising:
 - a frame comprised of a plurality of base plates; a plurality of uprights connectable to the base plates; and cross-braces and or guard rails mountable between adjacent uprights;
 - a stand-off assembly mounted to said uprights and having a standoff leg adapted to maintain a predetermined distance between the retaining wall and the uprights; and
 - an attachment assembly attachable to the stand-off assembly and adapted to engage the retaining wall to temporarily fix said frame to the retaining wall; said attachment assembly comprising a flexible attachment strap and a retainer; said attachment strap having a first end and a second end; said attachment strap being connected at said first end to said stand-off assembly; said attachment strap being sized to extend through said wall; said retainer engaging said attachment strap on a side of said wall opposite said frame to place a tensile stress on said attachment strap, thereby pulling said stand-off assembly, and hence said frame, against said wall, thereby securing said frame in place relative to said wall.
2. (Withdrawn) The retaining wall fall protection system of claim 1 further comprising a leveling adjustment screw pivotally attached to each base plate and having a leveling adjustment nut threaded thereon for supporting said upright; each said leveling adjustment nut receiving a bottom end of one of said uprights.
3. (Withdrawn) The retaining wall fall protection system of claim 1 comprising a coupling tube for connecting segments to form an upright of a desired height; said coupling tube

having a width, a height, and a length; the width of said coupling tube being smaller at opposite ends of said coupling tube than at a middle of said coupling tube.

4. (Withdrawn) The retaining wall fall protection system of claim 1 comprising a guardrail bracket mountable to the upright; said guardrails being mountable to said guardrail bracket.

5. (Withdrawn) The retaining wall fall protection system of claim 4 wherein said guardrail bracket comprises a base mountable to the upright and at least one toggle pin extending from the guardrail bracket base; said guardrail comprising an opening at at least one end thereof which is sized to fit over said toggle.

6. (Withdrawn) The retaining wall fall protection system of claim 1 wherein the standoff assembly comprises a base adapted to be secured to said upright; said standoff leg extending from said base, and an attachment dowel extending from said base;

said attachment assembly comprising an attachment strap having a first end and a second end; an eyelet in said first end sized and shaped to fit over said standoff assembly attachment dowel.

7. (Cancelled)

8. (Withdrawn) The retaining wall fall protection system of claim 6 wherein said retainer cooperating with said attachment strap to urge a surface of said retainer against a back surface of said retaining wall.

9. (Withdrawn) The retaining wall fall protection system of claim 8 wherein said attachment strap includes a slot at its said second end; said retainer comprising a body comprising a top surface, a bottom surface, a front face surface adapted to engage said retaining

wall, and an opening in said front face surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge engaging a surface of said retainer and an edge of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall.

10. (Withdrawn) The retaining wall fall protection system of claim 9 wherein said retainer body is generally elongate and comprises a back surface spaced from said front surface by said top and bottom surfaces; an opening in said back surface sized to allow said strap to pass therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

11. (Withdrawn) The retaining wall fall protection system of claim 10 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

12. (Withdrawn)The retaining wall fall protection system of claim 9 wherein the block used to construct the wall is an open block having a horizontal surface extending between side surfaces; the retainer body being generally C-shaped and comprising an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said retainer front face; said back wall having a height greater than the width of said block horizontal surface; said front face opening being positioned adjacent said retainer bottom surface.

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Rejected) An attachment assembly for securing an upright of a scaffolding system to a retaining wall comprised of a plurality of retaining wall blocks; the attachment assembly comprising:

a standoff bracket mountable to said upright; said standoff bracket assembly comprising a base adapted to be secured to said upright, a standoff leg extending from said base and an attachment dowel extending from said base; said leg engaging the retaining wall in use to maintain the frame a determined distance from the wall;

a flexible attachment strap having a first end and a second end and being of a length sufficient to pass through said wall; an eyelet in said first end sized and shaped to fit over said standoff assembly attachment dowel; said attachment strap including a slot at its said second end;

a retainer; said retainer comprising a body comprising a top surface, a bottom surface, a block engaging surface adapted to engage said retaining wall during use, and an opening in said block engaging surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge having a first side edge which engages a surface of said retainer and a second side edge which engages a surface of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall; said retainer cooperating with said attachment strap to pull said stand-off assembly toward said retainer, thereby urging a surface of said retainer and said stand-off against opposite sides of said retaining wall to secure the frame in position relative to the retaining wall.

17. (Rejected) The attachment assembly of claim 16 wherein said retainer body is generally elongate and comprises a back surface spaced from said block engaging surface by said

top and bottom surfaces; an opening in said back surface sized to allow said strap to pass therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

18. (Rejected) The attachment assembly of claim 17 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

19. (Withdrawn) The attachment assembly of claim 16 wherein said retainer is generally C-shaped and comprises an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said block engaging surface; said back wall having a height greater than the width of said block horizontal surface; said opening being positioned adjacent said retainer bottom surface.

20. (Withdrawn) A retaining wall fall protection system comprising:
a frame comprised of a plurality of base plates; a plurality of uprights connectable to the base plates; and cross-braces and/or guard rails mountable between adjacent uprights;
a stand-off assembly mounted to said uprights and having a standoff leg adapted to maintain a predetermined distance between the retaining wall and the uprights; and
an attachment assembly attachable to the stand-off assembly and adapted to engage the retaining wall to temporarily fix said upright to the retaining wall; said attachment assembly comprising:

a flexible attachment strap having a first end and a second end; said strap being adapted at said first end to be removably connected to said standoff assembly said

attachment strap being of a length sufficient to pass through said wall; said attachment strap including a slot at its said second end;

a retainer; said retainer comprising a body having a block engaging surface adapted to engage said retaining wall, an opening in said block engaging surface, opposed first and second surfaces extending from said block engaging surface, and aligned slots extending inwardly from a back of said surfaces, said slots being opened at said back surface of said back of said surfaces; said retainer body opening being sized to allow said attachment strap to pass therethrough; and

a wedge sized and shaped to be received in said attachment strap slot and said slots of said retainer surfaces; said wedge having a first side edge which engages an inner surface of said retainer slots and a second side edge which engages a surface of said attachment strap slot distal from said retainer surface, whereby, said wedge cooperates with said attachment strap to pull said stand-off assembly and said retainer against opposite sides of said retaining wall to secure said frame in position relative to said retaining wall.

21. (Withdrawn) The retaining wall fall protection system of claim 3 wherein said coupling tube and said uprights have openings which pass therethrough, the holes of the coupling tube being aligned with the holes in the uprights; said fall protection system further comprising a gravity pin; the gravity pin 46 comprising an L-shaped mounting portion and a generally U-shaped portion;

said mounting portion comprising a first leg and a second leg; said first leg being sized and shaped to extend through the aligned holes of the upright and coupling tube such that said

gravity pin can rotate relative to said uprights; said second leg extending generally perpendicularly from an end of said first leg;

 said U-shaped portion extending from an end of the mounting portion second leg and being in a plane generally perpendicular to the plane of the mounting portion; said U-shaped portion comprising a pair of short legs joined by a member;

 said gravity pin being rotatable relative to the upright between a raised position in which the mounting portion first leg can be passed through or removed from the aligned holes of the upright and the coupling tube and a lowered position in which the U-shaped section member rests against said upright and said U-shaped section legs extend along opposite sides of the upright to prevent the gravity pin mounting section first leg from exiting said aligned holes of the upright and coupling tube.

IX. EVIDENCE APPENDIX (37 CFR 41.37 (c)(1)(ix))

Exhibit A – Canadian Patent application 2,465,473

Exhibit B – Notice of Allowance in Canadian App. No. 2,465,473

Exhibit C – Canadian Office Action

Exhibit D – Applicant's response of December 7, 2007 to Canadian Office Action

X. RELATED PROOCEEDINGS APPENDIX (37 CFR 41.37 (c)(1)(x))

Not applicable.

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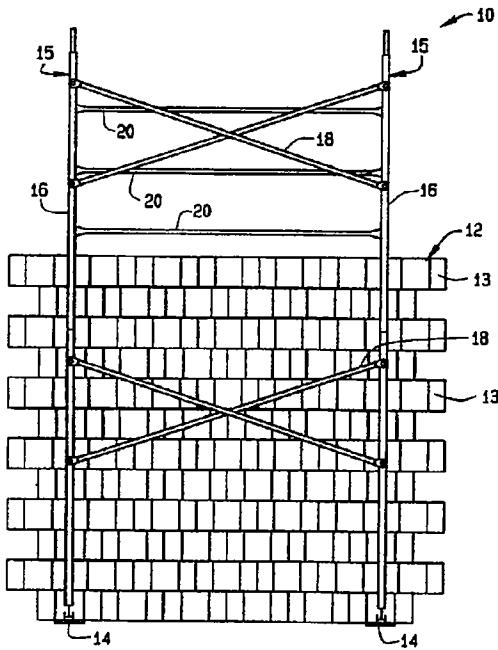
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(54) Titre : DISPOSITIF DE PROTECTION CONTRE LES CHUTES A MUR DE SOUTENEMENT MODULAIRE
(54) Title: MODULAR RETAINING WALL FALL PROTECTION SYSTEM



(57) Abrégé/Abstract:

The present disclosure provides a retaining wall fall protection system having a plurality of base plates. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an attachment assembly which secures the uprights in position adjacent the retaining wall. The attachment assembly comprises an attachment strap which is mounted to the upright and sized to extend through the retaining wall. A retainer on the opposite side of the wall engages a distal end of the attachment strap to secure the scaffolding to the retaining wall under construction.

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EXHIBIT

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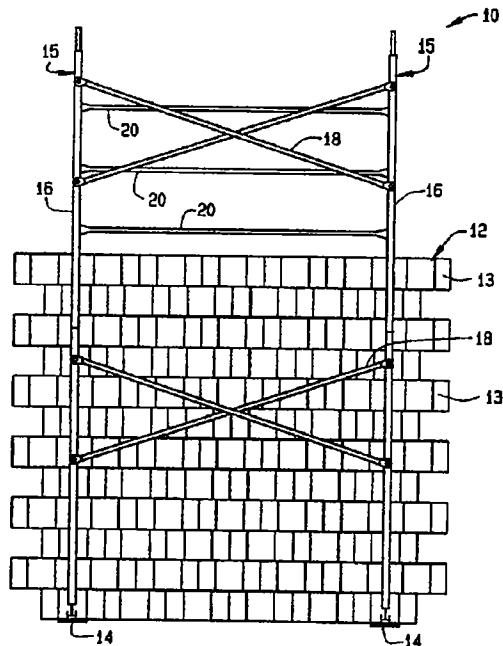
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ABSTRACT OF THE DISCLOSURE

The present disclosure provides a retaining wall fall protection system having a plurality of base plates. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an attachment assembly which secures the uprights in position adjacent the retaining wall. The attachment assembly comprises an attachment strap which is mounted to the upright and sized to extend through the retaining wall. A retainer on the opposite side of the wall engages a distal end of the attachment strap to secure the scaffolding to the retaining wall under construction.



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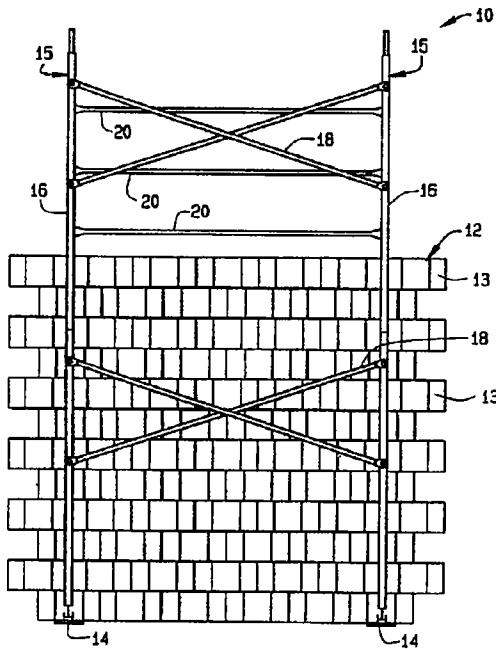
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(57) Abrégé/Abstract:

The present disclosure provides a retaining wall fall protection system having a plurality of base plates. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an attachment assembly which secures the uprights in position adjacent the retaining wall. The attachment assembly comprises an attachment strap which is mounted to the upright and sized to extend through the retaining wall. A retainer on the opposite side of the wall engages a distal end of the attachment strap to secure the scaffolding to the retaining wall under construction.

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ABSTRACT OF THE DISCLOSURE

The present disclosure provides a retaining wall fall protection system having a plurality of base plates. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an attachment assembly which secures the uprights in position adjacent the retaining wall. The attachment assembly comprises an attachment strap which is mounted to the upright and sized to extend through the retaining wall. A retainer on the opposite side of the wall engages a distal end of the attachment strap to secure the scaffolding to the retaining wall under construction.

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Provisional Application No. 60/465,954 which was filed April 28, 2003, which is entitled "Modular Retaining Wall Fall Protection System", and which is incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

BACKGROUND OF THE INVENTION

[0003] The Occupational Safety and Health Administration requires that retaining walls being built over a specified height must use a retaining wall fall protection system to prevent those building the wall from being injured by a fall. However, no retaining wall fall protection systems exist which allow the retaining wall builder to quickly assemble and disassemble a protection system and be able to quickly change the configuration of the protection system to protect workers as the wall is being built. As such, there is a need for a retaining wall fall protection system of the present invention.

BRIEF SUMMARY OF THE INVENTION

[0004] The present invention comprises a retaining wall fall protection system comprising a plurality of base plates held in position by a retaining wall. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an

attachment assembly which secures the uprights in position adjacent the retaining wall.

[0005] The attachment assembly comprises an attachment strap which is adapted at one end to be connected to the scaffolding upright. Preferably, a standoff bracket is provided to which the attachment strap is connected. The attachment strap is adapted at its opposite end to be connected to the retaining wall being constructed. The attachment strap can be connected directly to the wall, for example, to an alignment key on the blocks from which the wall is made.

[0006] Alternatively, and preferably, the attachment strap extends through the wall. A retainer on the opposite side of the wall engages a distal end of the attachment strap to secure the scaffolding to the retaining wall under construction. The strap can be in the form of a rod which is threaded or grooved at its distal end. In this case, the retainer includes a threaded portion or acts in a ratcheting manner to engage the strap. In a preferred alternative, the retaining strap includes a slot at its distal end and the retainer includes a wedge. The strap passes through the retainer, and the wedge is inserted in the slot, such that one edge of the wedge engages a far surface of the strap slot and an opposite edge of the wedge engages the retainer.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] FIG. 1 is plan view of an assembled retaining wall fall protection system according to an embodiment of the present invention;

[0008] FIG. 2 is side view of an assembled retaining wall fall protection system according to an embodiment of the present invention used with a vertical retaining wall;

[0009] FIG. 3 is side view of an assembled retaining wall fall protection system according to an embodiment of the present invention used with a sloped retaining wall;

[0010] FIGS. 4A and 4B are front and side elevational views of an upright for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0011] FIGS. 5A and 5B are a top and side plan views, respectively, of a base plate for use with a retaining wall fall protection system according to an embodiment of the present invention having a retaining wall block placed thereon;

[0012] FIGS. 6A and 6B are plan views of a coupling tube for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0013] FIGS. 6C and 6D are section views of the coupling tube taken along lines C-C and D-D, respectively, of Fig. 6B;

[0014] FIGS. 7A and 7B are front and side views of a gravity pin in use with an upright according to an embodiment of the present invention;

[0015] FIG. 7C-F are top plan, side elevational, front elevational and perspective views, respectively of the gravity pin;

[0016] FIG. 8 is a plan view of a cross-brace for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0017] FIG. 9 is a plan view of an A-type guardrail for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0018] FIG. 10 is a plan view of a B-type guardrail for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0019] FIGS. 11A and 11B are front and right side plan views of a guardrail bracket for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0020] FIGS. 12A and 12B are front and right side plan views of a standoff bracket for use with a retaining wall fall protection system according to an embodiment of the present invention;

[0021] FIG. 12C is a perspective view of the standoff bracket mounted to a scaffolding upright;

[0022] FIGS. 13A and 13B are front and side plan views of a wall attachment assembly for securing scaffolding uprights to the retaining wall being constructed, the attachment assembly comprising a connecting member and a retainer;

[0023] FIG. 14 is a side view of a wall attachment assembly and a standoff bracket in position relative to a retaining wall fall to secure scaffolding to the retaining wall;

[0024] FIG. 15 is a back elevational view of a wall attachment assembly and a standoff bracket in use with a curved retaining wall;

[0025] FIG. 16 is a top plan view of a wall attachment assembly and standoff bracket in use with a curved retaining wall;

[0026] FIG. 17 is an exploded view of an alternative wall attachment assembly;

[0027] FIGS. 18 and 19 are top plan and side elevational views showing the wall attachment assembly of FIG. 17 mounted to a stand-off bracket and with a connecting strap extending through the retaining wall, the wall being shown in phantom;

[0028] FIGS. 19A-C are rear perspective, top plan, and front elevational views of a retainer for use with the attachment assembly of FIG. 17;

[0029] FIG. 19D is a cross-sectional view of the retainer taken along line A—A of FIG. 19C;

[0030] FIG. 20 is a perspective view of an another alternative attachment assembly for use with an open-walled system; and

[0031] FIG. 21 is a perspective view showing the retainer of the attachment assembly of FIG. 20 mounted to a wall block.

[0032] Corresponding reference numerals will be used throughout the several figures of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0033] While the invention is susceptible of embodiment in many different forms, there is described in detail preferred embodiments of the invention. It is to be understood that the present disclosure is to be considered only as an example of the principles of the invention. This disclosure is not intended to limit the

broad aspect of the invention to the illustrated embodiments. The scope of protection should only be limited by the claims.

[0034] Referring to Figs. 1 and 2, the present invention comprises a fall protection system 10 for protecting workers while they are building a retaining wall 12 made from blocks 13. As will be apparent, the fall protection system 10 comprises a scaffolding system which, using brackets and attachment assemblies of the invention, is secured to the wall 12. Upon completion of the wall 12, the scaffolding is removed from the wall.

[0035] The system 10 generally comprises base plates 14 each having an upright assembly 15 made from uprights 16 attached to the base plates 14. The adjacent uprights 16 are connected by cross-braces 18 and guardrails 20 which extend between the uprights 16. Referring to Figs. 4A and 4B, each upright 16 comprises a tube having several holes 22 formed therein. The upright 16 further comprises toggle studs 26.

[0036] Referring to Figs. 1, 2, 5A and 5B, base plates 14 are placed upon the ground and the retaining wall 12 is built upon a portion of the base plate 14 thus securing it in place. As seen, the base plate 14 has a bottom surface 14a and front and back lips 14b and 14c. The retaining wall block 13 rests against the back lip 14b. The base plate 14 has a length greater than the depth of the block and extends forwardly of the block. Hence, the front lip 14b is forward of the front surface of the wall blocks 13. The base plate 14 further includes a leveling screw 28 pivotally mounted to the base plate 14 to pivot in a plane generally perpendicular to the base plate 14. A leveling nut 30 is threadingly mounted on

the screw 28. The leveling nut 30 has first and second diameters 32, 34. The first diameter 32 is slightly smaller than the inside diameter of an end 24 of the upright 16 such that an upright 16 may be placed over the first diameter 32. The second diameter 34 is larger than an outside diameter of the upright 16 such that when the upright 16 is placed over the first diameter 32, it rests upon a shoulder 36 formed by the interface of the first diameter 32 and the second diameter 34. In this manner, the height of the upright 16 may be adjusted with respect to other uprights 16 by turning the leveling nut 30 with respect to the leveling screw 28 and the base plate 14.

[0037] Furthermore, referring to Figs. 4A-B and 6A-D, multiple uprights 16 may be attached at their ends to build longer upright assemblies 15 by placing a coupling tube 36 in the ends 24 of two uprights 16. The coupling tubes 36 comprise square tube that has been compressed at its ends 38 such that the tube is narrower in one dimension at its ends than it is at its center 40. For example, in Fig. 6C, a coupling tube 36 originally having a outside dimensions of 1.477 inches square, is compressed in one direction at its ends such that one outside dimension is reduced to 1.416 inches. However, the center 40 of the coupling tube 36 is compressed very little, if any, as shown in Fig. 6D. In this manner, coupling tubes 36 may be easily inserted into the ends 24 of the uprights 16 initially and provide an increasingly tighter fit as they are inserted farther in to the upright 16. The coupling tube 36 further includes a pair of coupling pin holes 42 and a spring pin hole 44. The coupling pin holes 44 align with holes 22 of the uprights such that gravity pins 46 (Fig. 7A-C) may be

inserted through the coupling tube 36 and the upright 16 to prevent them from becoming unattached. The spring pin hole 44 also aligns with a hole 22 of the upright 16 and has a spring loaded pin (not shown) disposed within the hole 44.

[0038] Referring to Figs. 7A-C, the gravity pin 46 comprises a rod bent into the configuration shown. The pin includes an L-shaped mounting section 46a having a portion 46c which extends through the holes 22 and 42 of the upright 16 and coupling tube 36, respectively, and a short leg 46d which extends generally perpendicularly from one end of the portion 46c. A U-shaped section 46b extends from an end of the short leg 46d and is in a plane perpendicular to the plane of the mounting section 46a. The U-shaped section 46b comprises a pair of short legs 46e,f joined by a section 46g. The U-shaped section leg 46e extends the mounting portion leg 46d. As best seen in FIG. 7C, the leg 46f is parallel to, and longer than, the leg 46e. Hence, the leg 46f crosses the plane of the mounting section 46a. The pin 46 is inserted into the upright 16 in the position shown in the bottom of FIGS. 7A and 7B and is allowed to drop by the force of gravity to the position shown in the top of FIGS. 7A and 7B. In the locked position, the U-shaped lock section extends around three sides of the upright 16 to prevent the pin 46 from being removed from the upright 16 without lifting the pin back to the "insert" position. As such, the pin 46 cannot accidentally be removed from the upright 16 by vibration or other accident means.

[0039] A cross-brace 18 shown in FIG. 8 comprises two lengths of rod 48 joined at their centers by a pin 50. At the ends of the rods 48 are flattened end

portions 52 having a hole 54 therein. The cross-braces 18 are attached to the uprights 16 by placing the toggle studs 26 of the uprights 16 through the holes 54 of the cross-brace 18.

[0040] Referring to Figs. 9, 10, 11A and 11B, guardrails 20 are attached to the uprights 16 by means of guardrail brackets 56. FIG. 9 illustrates guardrails 20 of the A-type and Fig. 10 illustrates guardrails 20 of the B-type. B-type guardrails 20 comprise a tube having both ends 66 flattened and a hole 68 in one of the ends 66. A-type guardrails comprise a tube having both ends 66 flattened and a hole 68 in each end 66. Both the A- and B- type guardrails include holes at their centers through which the pin 50 can extend to pivotally connect two guardrails together.

[0041] Turning to FIGS 11A and 11B, the guardrail brackets 56 comprise a C-shaped channel 58 having a plurality of U-hooks 60 and toggle studs 62 attached thereto and extending from a front face of the channel member. Holes 64 are formed in the sidewall of the channel member. The toggle studs 62 each include an arm 62a and a finger 62b pivotally mounted to the end of the arm. The stud arm 62a and finger 62b are sized to allow the holes 54 of the cross-brace rods 48 and the holes 68 of the guardrail rods 20 to pass thereover. Hence, to place the cross-braces or the guardrails on the brackets 56, the toggle stud is positioned so that the toggle stud arm and finger are aligned. The cross-brace rods or guard rail rods are then slid over the toggle stud, and, with the rod opening 54 or 68 positioned on the toggle stud arm, the toggle stud finger is rotated relative to the arm to prevent the rod from coming off the arm.

[0042] FIGS. 12A-B show a standoff bracket 67 according an embodiment of the present invention. The standoff bracket 67 comprises a C-shaped channel member 68 having a hole 70 in its sidewall and a standoff 72 extending from its front face. The standoff 72 further comprises a wall attachment dowel 74. The channel member is sized and shaped to be received on the scaffolding uprights 16, and the hole 70 is sized and shaped to be aligned with the openings in the uprights such that a gravity pin 46 can pass through the bracket 67 and the upright 16, as seen in FIG. 12C to maintain the bracket 67 on the upright.

[0043] An alternative standoff bracket 67' is shown in FIG. 12C. The bracket 67' includes a channel member 68 identical to the channel member 68 of FIGS. 12A,B. The standoff member 72' however, is slightly different. Rather than being a straight rod, as is the standoff member 72, the standoff member 72' comprises a pair of members comprising a first portion 72a which extends generally perpendicularly from the front face of the channel member 68. The first portions 72a of the two members are adjacent and parallel to each other. A second portion 72b extends generally perpendicular to the first member 72a in a generally horizontal plane. The second portions 72b of the two member extend away from each other. Lastly, third portions 72c extend rearwardly from the second portions to be generally parallel to each other and to the first portions 72a. Hence, the stand off is generally "u" in plan view. The attachment dowel 74 extends generally perpendicularly from the stand off first portion 72a to be generally parallel to the front face of the channel member 68. Although the bracket 67' is shown to be connected to the upright 16 with the attachment dowel

member extending downwardly, the bracket 67' can be connected to the upright with the attachment dowel 74 extending upwardly.

[0044] FIGS. 13A-B show a wall attachment assembly 76. The wall attachment assembly 76 comprises an attachment strap in the form of a threaded rod 78 having an eye 80 at one end. Threaded onto the threaded rod 78 is a retainer 82. The eye 80 is sized to be able to fit over the attachment dowel 74 of the bracket 67. Alternatively, the rod 78 could be grooved, rather than threaded, and the retainer 82 could be adapted to engage the grooves to provide a ratcheting type engagement between the rod 78 and the retainer 82.

[0045] In order to assemble the retaining wall fall protection system 10 of the present invention, the user begins by assembling the wall 12 on top of the base plates 14. As the wall 12 increases in height, the user adds uprights 16 by first placing uprights upon the leveling nuts 30. Cross-braces 18 are attached to the toggle studs 26 of the uprights 16, as noted above, to provide stability to the uprights 16. Referring to FIG. 14, the threaded rod 78 of the wall attachment assembly 76 is fed through the wall 12 by pulling the rod 78 through a preexisting passage between the wall blocks 13. The retainer 82, which is too large to feed through the wall 12, is threaded onto the rod 78. The wall attachment rod 78 is attached to the standoff bracket 67 by inserting the dowel 74 through the eye 80. The retainer 82 is threaded onto the rod 76 until the standoff 72 makes contact with the wall 12. The standoff brackets 67 are attached to the uprights 16 with gravity pins 46 to mount the standoff brackets to the uprights the mounting section 46a of the gravity pin 46 passes through the holes 70 of the standoff

bracket 67 of the upright 16. In this manner, the fall protection system is supported by the wall 12 and maintained a predetermined distance from the wall.

[0046] Next, guardrail brackets 56 are attached to the uprights 16 with gravity pins 46. This is accomplished by placing the C-shaped channel 58 of the guardrail bracket 56 over the upright 16 and aligning one of the holes 64 with holes 22 in the upright 16. The gravity pin 46 is placed through these aligned pairs of holes 22, 64 and allowed to drop to the locked position. Furthermore, the A-type guardrails 20 are attached to the guard rail brackets 56 by inserting the guardrail end 66 without the hole 68 though the U-hooks 60 of the guardrail bracket 20 and attaching the guard rail end 66 with the hole 68 over the toggle studs 62 of the guardrail bracket 56 of the adjacent upright 16. B-type guardrails 20 may be installed by place the holes 68 of each end 66 over toggle studs 62 of the guardrail brackets 56. In this manner, the guard rails form a fence to protect workers from falling over the edge of the wall 12.

[0047] As the wall 12 increases in height, the guardrails 20 must necessarily be raised and the uprights 16 lengthened. To lengthen the uprights 16, coupling tubes 36 are inserted into the top end of the existing uprights 16 and a gravity pin is placed through aligned holes 22, 42 of the upright 16 and the coupling tube 36. Another upright 16 is then placed over an exposed portion of the coupling tube 36 and another gravity pin placed through holes 22, 42 of the new upright 16 and the coupling tube 36. The guardrail brackets 56 are then removed from the uprights 16 and reattached at a higher position upon the newly added uprights 16. Alternatively, the guardrail brackets 56 can be left in place and additional

guardrail brackets 56 can be added as the wall increases in height. Additional wall attachment assemblies 76 are mounted to the uprights 16 as needed to ensure that the uprights are secured against the wall 12.

[0048] As can be seen from FIG. 3, the retaining wall fall protection system can be used with vertical retaining walls 12 as in FIG. 2 or with sloped retaining walls 12 as in FIG. 3 by virtue of the pivoting connection of the leveling screw 28 to the base plate 14.

[0049] When the wall is completed the protection system 10 can be disassembled and removed from the wall 12. All that will remain are the base plates 14 and the brackets 82 located between the back of the wall and the earth.

[0050] An alternative wall attachment assembly 100 is shown in FIGS. 17-19D. The attachment assembly 100 comprises an attachment strap 102 having an eyelet 104 at one end and a slot 106 at the opposite end. The eyelet 104 is sized to fit over the attachment dowel 74 of the bracket 67 or 67'. The strap 102 is preferably formed from a material so that it will be flexible. A preferred material is a plastic, such as nylon. The strap 102 has length sufficient to extend through the retaining wall 12 as seen in FIGS. 18A,B. The ends 102a,b of the strap 102, where the eyelet 104 and slot 106, respectively, are located, is thicker than the center section 102c of the strap.

[0051] The attachment assembly also includes a retainer 110 (FIGS. 19A-D) is provided to be positioned on the back side of the retaining wall to receive the strap 102. The retainer 110 includes a body 112 having a top surface 114, bottom surface 116, and side surfaces 118. A front face 120 is formed at the

front of the body 112. As seen, the front face 120 forms a flange which extends around three sides of the body 112. If desired, the front face 120 could have an area equal to the area defined by the front of the body (i.e. the face 120 would not define a flange). Alternatively, the front face 120 could form a flange on only two sides of the body or on all four sides of the body. The retainer includes an opening 122 in the front face 120 and an opening 124 on the back surface 126 of the body. The front and back openings 122 and 124 are sized to permit the strap 102 to pass through the retainer 110. As shown, the back opening is generally oval in shape, and the front opening is generally rectangular. If desired, both openings could be of the same size and shape. Lastly, the retainer includes slots 128 at the back of the top and bottom body surfaces 114 and 116. As seen in FIG. 19D, the back surfaces 130, 131 of the two slots form an angle α relative to the back surface of the body. The angle α is about 5° - 10° , and preferably, about 8° . Also, as seen, slots 128 in the top and bottom surfaces are formed such that their respective back surfaces 130 and 131 are co-linear.

[0052] A wedge 140 is provided with the retainer. As best seen in FIG. 18B, the wedge 140 is generally trapezoidal in shape, and has two sloped side edges which angle away from each other, such that the top of the wedge is wider than the bottom of the wedge. Preferably, the slope of the wedge side edges corresponds substantially to the slope or angle α of the retainer body slot back walls 130, 131. The wedge 140 has a thickness such that it can be received in the slot 106 of the attachment strap 102. The wedge has a width at its top

greater than the length of the strap slot 106 and a width at its bottom less than the length of the strap slot 106.

[0053] To use the attachment assembly 100, the bracket 67 (or 67') is mounted to the scaffolding upright such that such that the attachment dowel 74 is positioned near the top of a row of blocks of the wall 12 under construction. The strap 102 is passed through the wall 12 as seen in FIGS. 14-16. The strap eyelet 104 is passed over the attachment dowel 74, as seen in FIGS. 18A,B, and the retainer 110 is slid over the end of the strap 102, and the front face 120 of the retainer is positioned against the back side of the wall. The strap and retainer are sized such that, when the retainer 110 is slid over the strap, a portion of the strap slot 106 extends beyond the back surface 130,131 of the slots 128 while a portion of the strap slot 106 is forward of the retainer body slots 130, 131. With the stand off 72 (72') against the retaining wall, as seen in FIG. 18A,B, the wedge 140 is inserted in the strap slot 106. As can be appreciated, one side edge of the wedge will engage the end of the strap slot while the other side edge of the wedge 140 will engage the walls 130, 131 of the retainer body slots 128. As the wedge 140 is driven into the slot, the wedge will urge the strap 102 and retainer 110 in opposite directions, such that that the retainer 110 and the bracket standoff 72 (72') will be pulled into tight contact with the retaining wall being built. As can be appreciated, the wedge 140 will be frictionally held in place in the strap slot 106 and the retainer body slot 128 and the retaining wall 12 will be tightly sandwiched between the retainer 110 and the bracket standoff 72 (72'). Hence, the scaffolding upright 116 will be held securely in place relative to the wall 12.

[0054] The retainer 110 is designed for use with a closed wall system. An alternative retainer 110' (FIGS. 20-21) is provided to enable the attachment system 100 to be used with an open wall system. As is known, in a closed wall system, the front faces of the blocks are solid, to provide a solid or uninterrupted front surface to the wall. In an open wall system, on the other hand, the blocks 13' are open along their front and back faces, and may even be open along their top surfaces. Hence, blocks 13' can be in the form of a tube or can be generally U-shaped. As is known, an open wall system allows for vegetation to be planted in the openings on the wall. The retainer 110' is in the form of a C-channel having top and bottom surfaces 150 and 152 and a back wall 154. A slot 156 through which the strap 102 can pass is formed at the bottom of the back wall 154. The back wall 154 is sized such that the inner surface of the back wall (i.e., the distance from the bottom of the top surface 150 to the top of the bottom surface 152 is greater than the width of the block wall, as seen in FIG. 21. Hence, a gap will be formed between the bottom of the block and the top of the retainer bottom surface 152. This gap is sized to allow the strap 102 to pass between the block retainer bottom surface and through the retainer slot 156. The retainer 110' is otherwise used substantially in the same was as the retainer 110, as described above.

[0055] After the wall 12 has been constructed, the scaffolding is removed from the wall. As can be appreciated, the straps 102 pass through the wall, and cannot be completely removed from the wall. Rather, the strap is cut off as close as possible to the wall, so that the strap will not be visible. The strap is

preferably made from a plastic, to allow for easy cutting of the strap and to provide a strap that will not rust. A metal strap will rust, and the rust will stain the wall 12. The use of a plastic strap 102 will avoid this. Additionally, the retainers 110 and 150 will be positioned on the back side (or earth side) of the wall, and will also stay with the wall.

[0056] While the specific embodiments have been described, numerous modifications come to mind without significantly departing from the spirit of the invention, and the scope of protection should only limited by the scope of the accompanying claims. For example, the attachment assembly could be modified to be connected to a positioning projection or key on the wall blocks themselves. In this instance, the strap will not extend through the wall. Rather, the strap will be provided with an opening sized and shaped to be received on the block projection or key. The distance between this block engaging opening and the strap eyelet will be sized such that the bracket standoff 72 (72') will contact the wall. The retainer 82 of FIGS. 13A,B could include a threaded nut which, when threaded onto the threaded end of the rod 78, urges said retainer 82 against the back surface of the retaining wall 12. Although the slots 128 of the retainer 110 are shown to be positioned at the back of the retainer, the slots could be positioned between the front and back ends of the retainer. In this instance, the slots would have to have a length greater than the top of the wedge 140 so as not to interfere with the operation of the wedge. Although the gravity pin 46 is preferred to connect the various brackets to the scaffolding uprights, the brackets could be secured in various other ways as well. For example, spring biased pins,

straight pins, etc. could be used in lieu of the gravity pins. These examples are merely illustrative.

CLAIMS:

1. A retaining wall fall protection system comprising:
 - a plurality of base plates;
 - a plurality of uprights connectable to the base plates;
 - cross-braces mountable between adjacent uprights;
 - guard rails mountable between adjacent uprights;
 - a stand-off assembly mounted to said uprights and having a standoff leg adapted to maintain a predetermined distance between the retaining wall and the uprights; and
 - an attachment mechanism attachable to the stand-off assembly and adapted to engage the retaining wall to temporarily fix said upright to the retaining wall.
2. The retaining wall fall protection system of claim 1 further comprising a leveling adjustment screw pivotally attached to each base plate and having a leveling adjustment nut threaded thereon for supporting said upright.
3. The retaining wall fall protection system of claim 1 comprising a coupling tube for connecting segments to form an upright of a desired height.
4. The retaining wall fall protection system of claim 1 comprising a guardrail bracket mountable to the upright; said guardrails being mountable to said guardrail bracket.
5. The retaining wall fall protection system of claim 4 wherein said guardrail bracket comprises a base mountable to the upright and at least one

toggle pin extending from the guardrail bracket base; said guardrail comprising an opening at at least one end thereof which is sized to fit over said toggle.

6. The retaining wall fall protection system of claim 1 wherein the standoff assembly comprises a base adapted to be secured to said upright; said standoff leg extending from said base, and an attachment dowel extending from said base;

said attachment assembly comprising an attachment strap having a first end and a second end; an eyelet in said first end sized and shaped to fit over said standoff assembly attachment dowel.

7. The retaining wall fall protection system of claim 6 wherein said attachment strap is adapted at its said second end to engage said retaining wall.

8. The retaining wall fall protection system of claim 7 wherein said attachment strap is of a length sufficient to pass through said wall; said attachment assembly comprising a retainer; said retainer cooperating with said second end of said attachment strap to urge a surface of said retainer against a back surface of said retaining wall.

9. The retaining wall fall protection system of claim 8 wherein said attachment strap includes a slot at its said second end; said retainer comprising a body comprising a top surface, a bottom surface, a front face surface adapted to engage said retaining wall, and an opening in said front face surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge engaging a surface of

said retainer and an edge of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall.

10. The retaining wall fall protection system of claim 9 wherein said retainer body is generally elongate and comprises a back surface spaced from said front surface by said top and bottom surfaces; an opening in said back surface sized to allow said strap to pass therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

11. The retaining wall fall protection system of claim 10 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

12. The retaining wall fall protection system of claim 11 wherein the block used to construct the wall is an open block having a horizontal surface extending between side surfaces; the retainer body being generally C-shaped and comprising an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said retainer front face; said back wall having a height greater than the width of said block horizontal surface; said front face opening being positioned adjacent said retainer bottom surface.

13. An attachment assembly for securing an upright of a scaffolding system to a retaining wall comprised of a plurality of retaining wall blocks; the attachment assembly comprising:

an attachment strap adapted at a first end thereof to be removably connected to said upright and adapted at a second end to be connected to said wall.

14. The attachment assembly of claim 13 including a standoff bracket mountable to said upright; said standoff bracket assembly comprising a base adapted to be secured to said upright, a standoff leg extending from said base, and an attachment dowel extending from said base; said attachment strap having an eyelet in said first end sized and shaped to fit over said standoff assembly attachment dowel.

15. The attachment assembly of claim 13 wherein said attachment strap is of a length sufficient to pass through said wall; said attachment assembly comprising a retainer; said retainer cooperating with said second end of said attachment strap to urge a surface of said retainer against a back surface of said retaining wall.

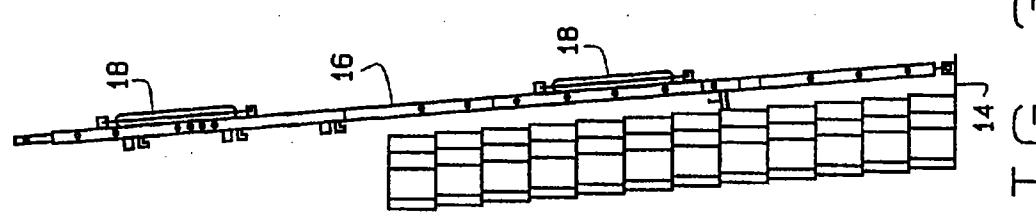
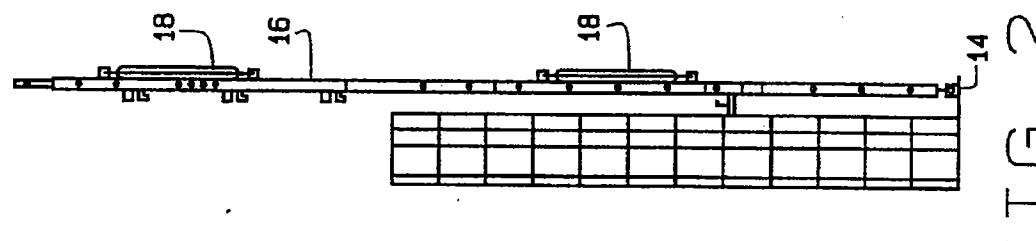
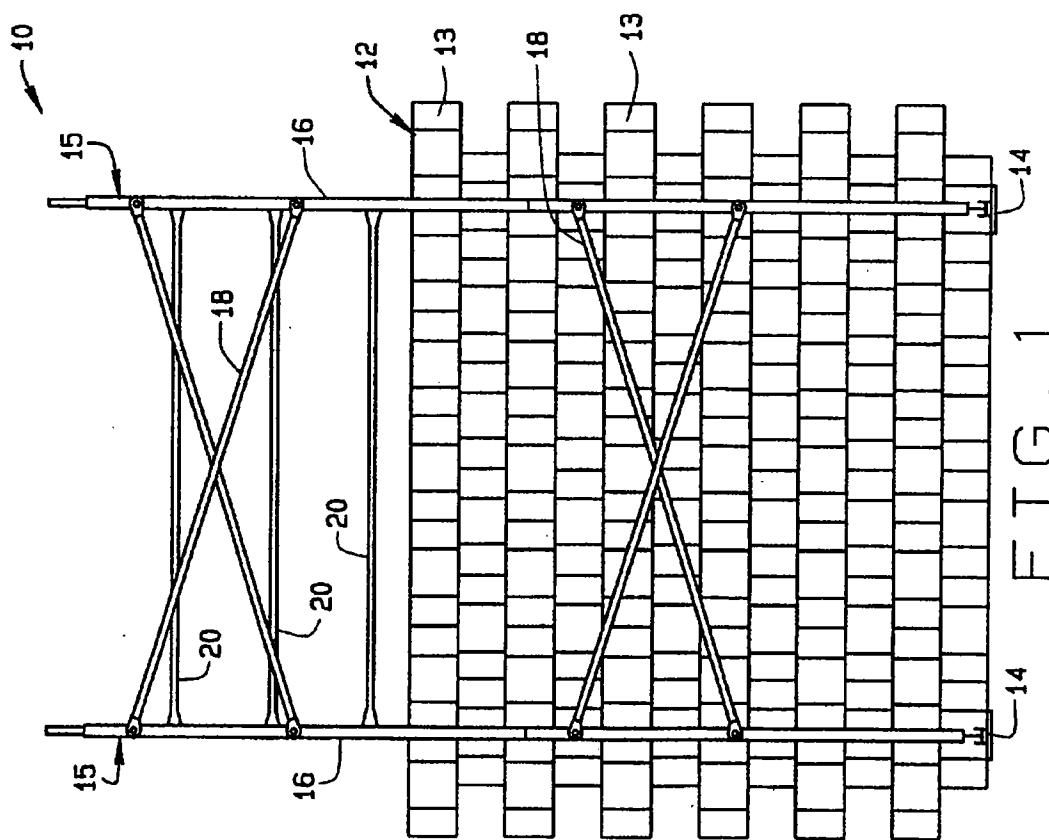
16. The attachment assembly of claim 15 wherein said attachment strap includes a slot at its said second end; said retainer comprising a body comprising a top surface, a bottom surface, a block engaging surface adapted to engage said retaining wall, and an opening in said block engaging surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge having a first side edge which engages a surface of said retainer and a second side edge which engages

a surface of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall.

17. The attachment assembly of claim 16 wherein said retainer body is generally elongate and comprises a back surface spaced from said block engaging surface by said top and bottom surfaces; an opening in said back surface sized to allow said strap to pass therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

18. The attachment assembly of claim 17 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

19. The attachment assembly of claim 16 wherein said retainer is generally C-shaped and comprises an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said block engaging surface; said back wall having a height greater than the width of said block horizontal surface; said opening being positioned adjacent said retainer bottom surface.



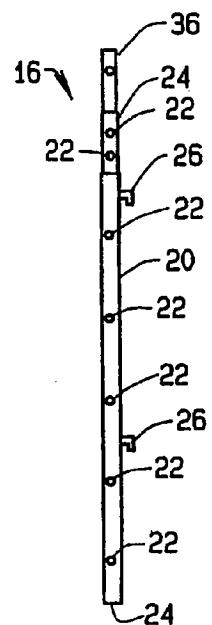


FIG. 4A

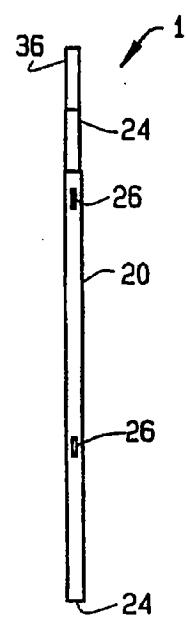


FIG. 4B

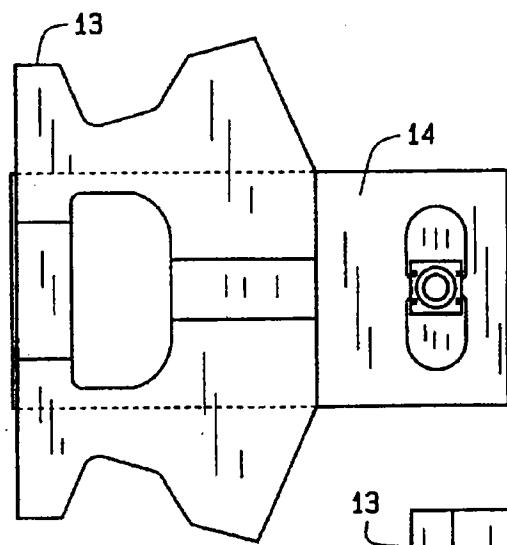


FIG. 5A

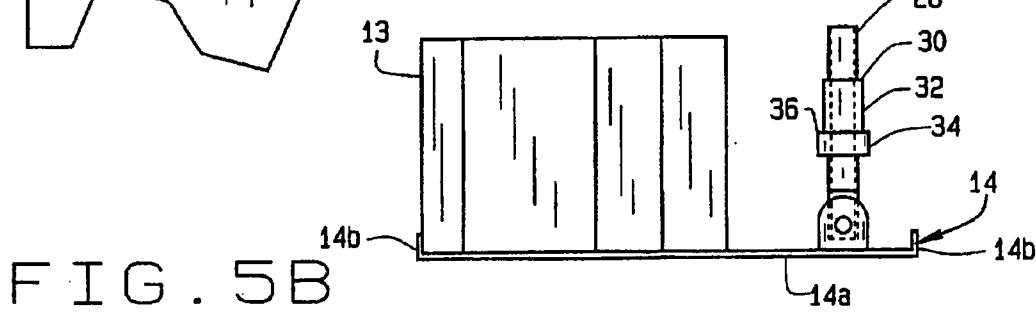


FIG. 5B

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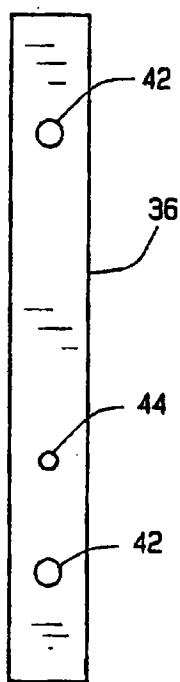


FIG. 6A

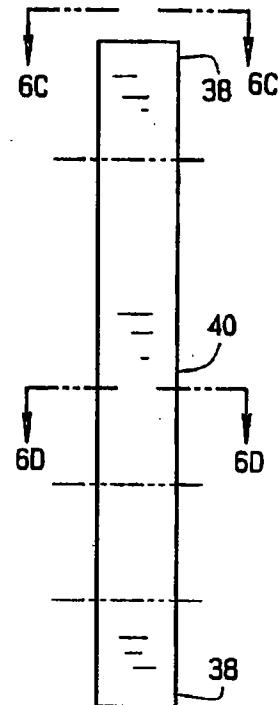


FIG. 6B

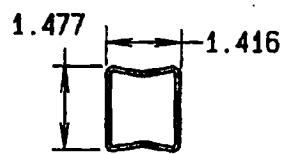


FIG. 6C

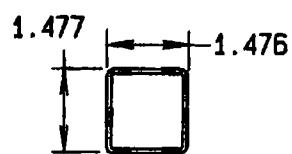


FIG. 6D

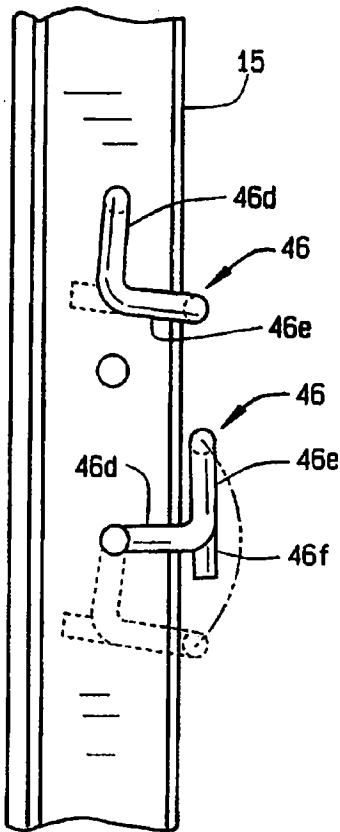


FIG. 7A

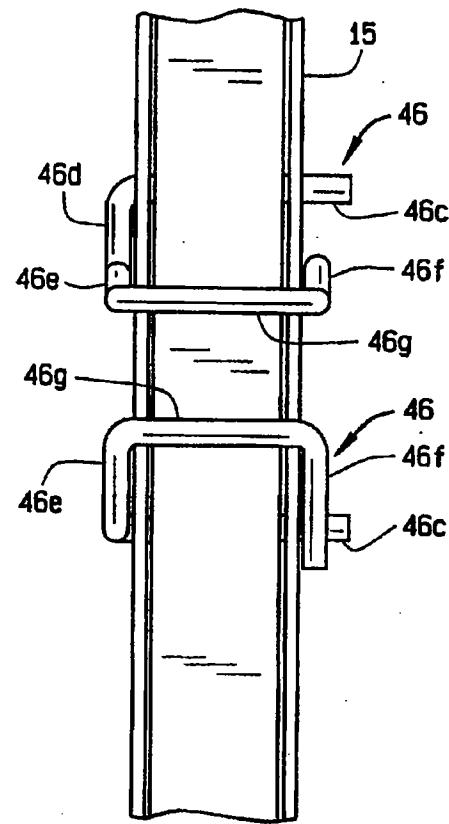


FIG. 7B

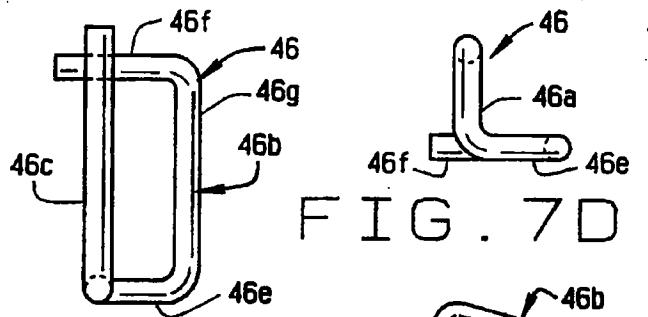


FIG. 7C

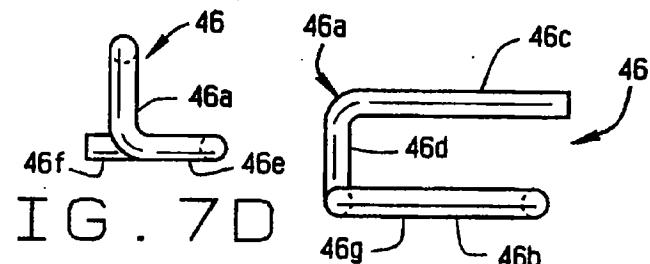


FIG. 7D

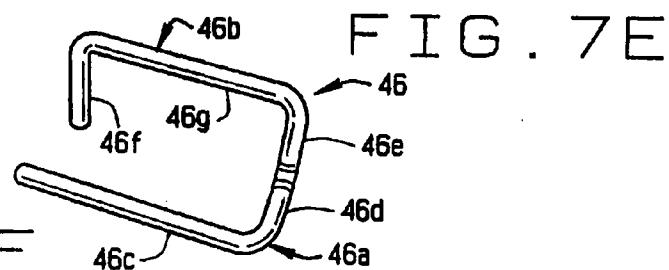
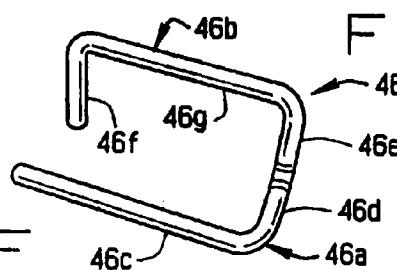


FIG. 7E

FIG. 7F



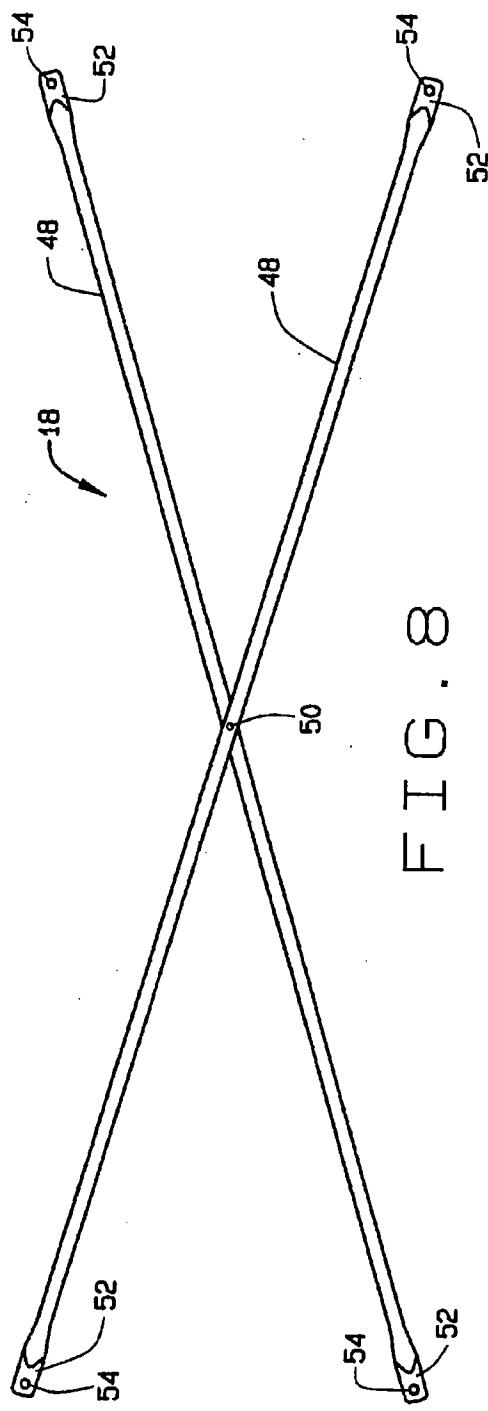


FIG. 8

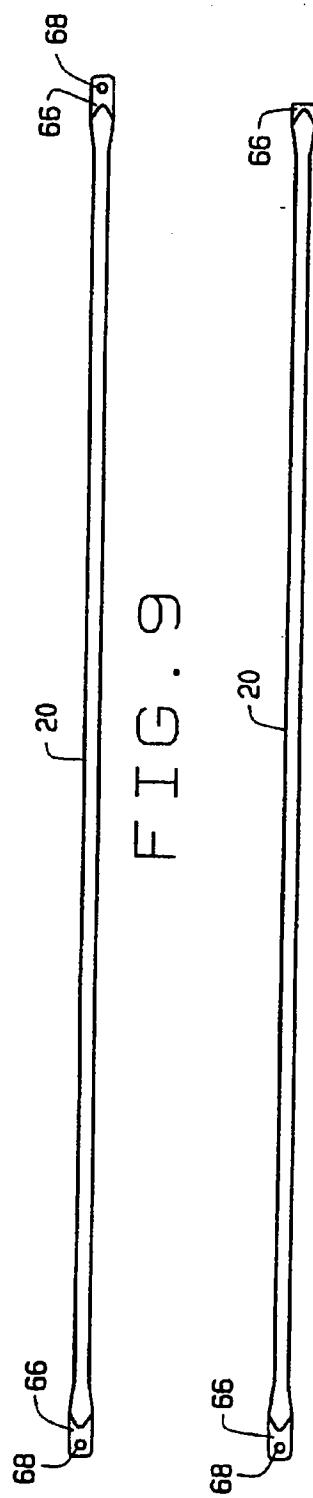


FIG. 9

FIG. 10

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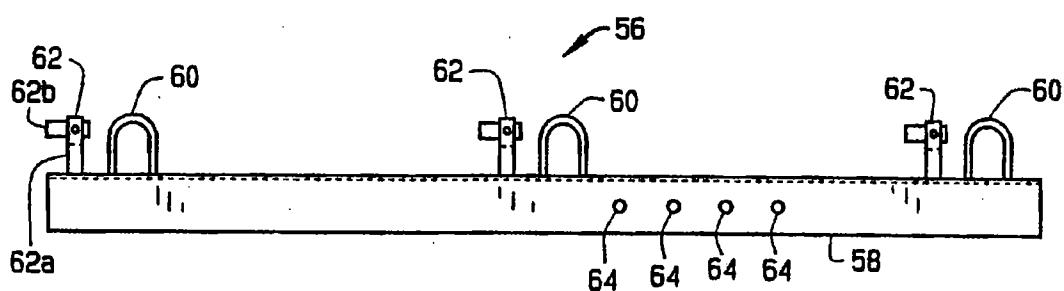


FIG. 11A

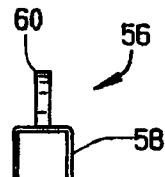


FIG. 11B

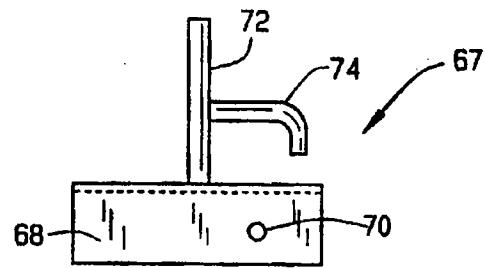


FIG. 12A

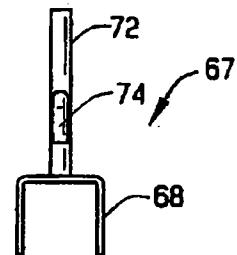


FIG. 12B

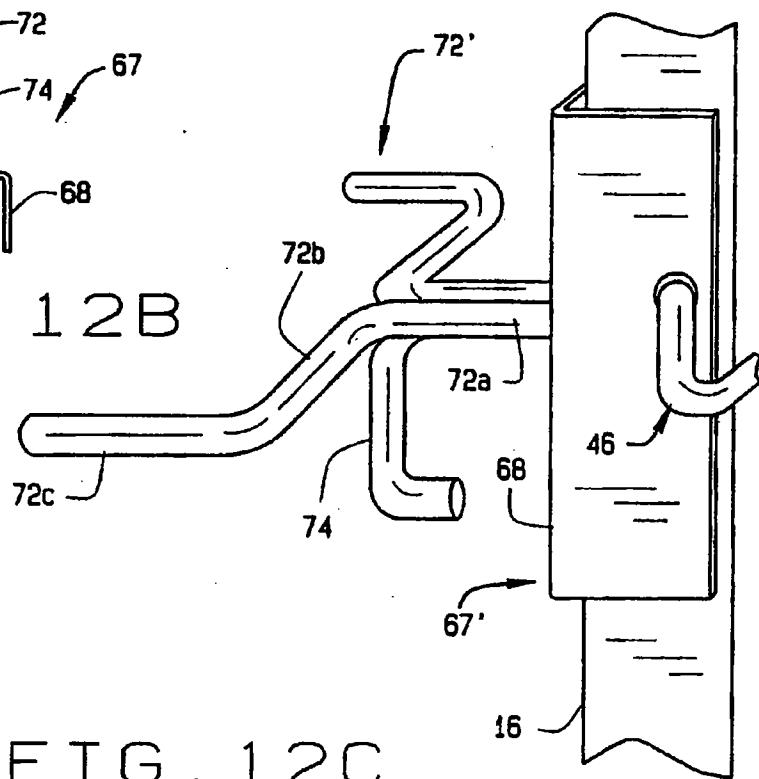
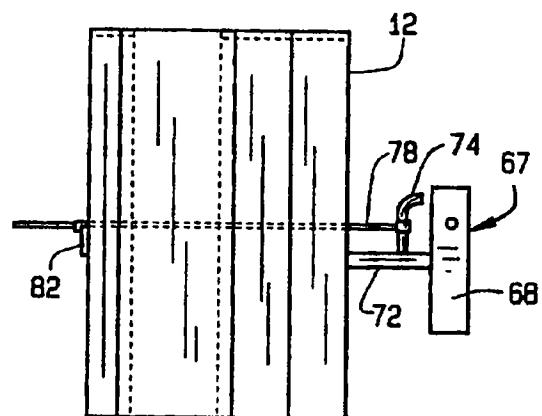
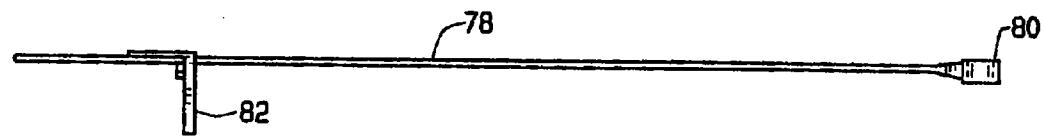
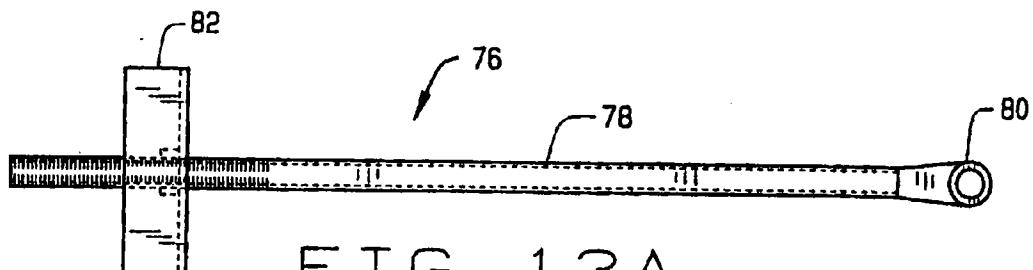


FIG. 12C



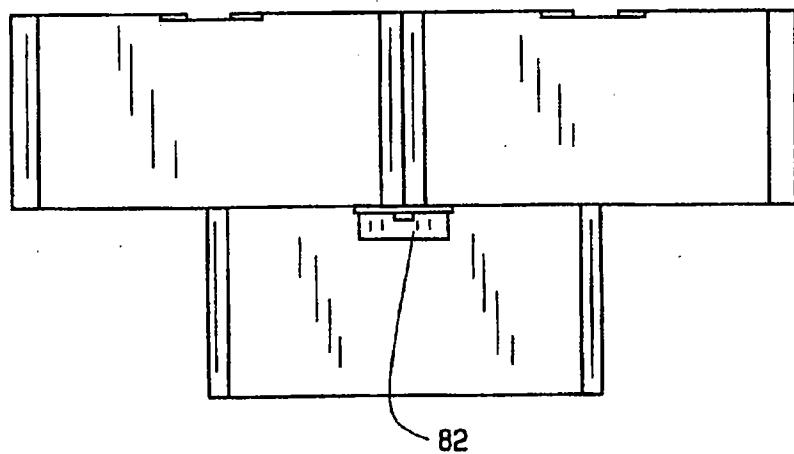


FIG. 15

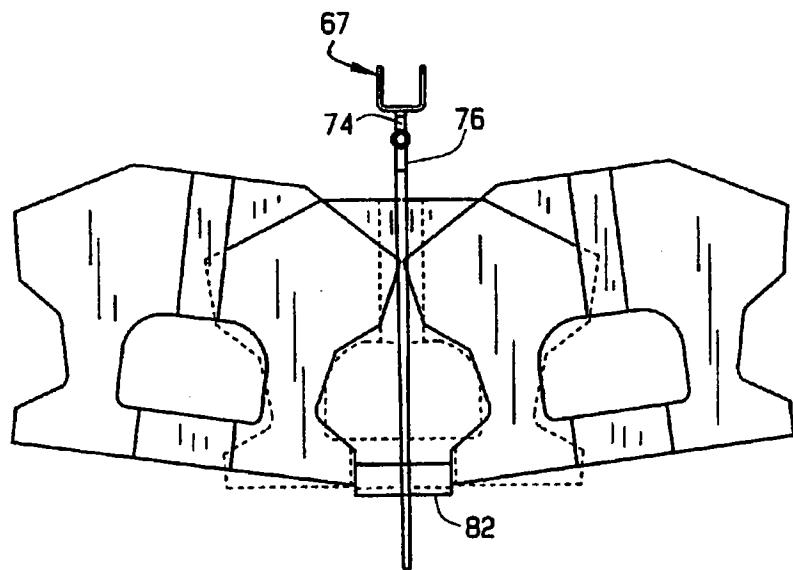


FIG. 16

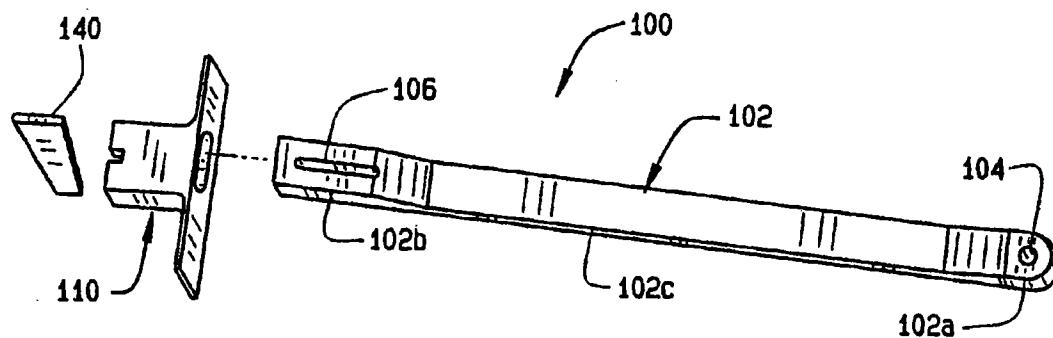


FIG. 17

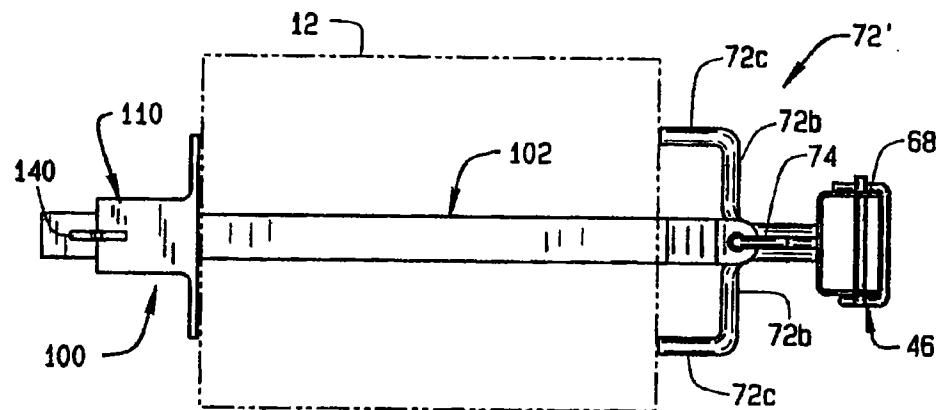


FIG. 18

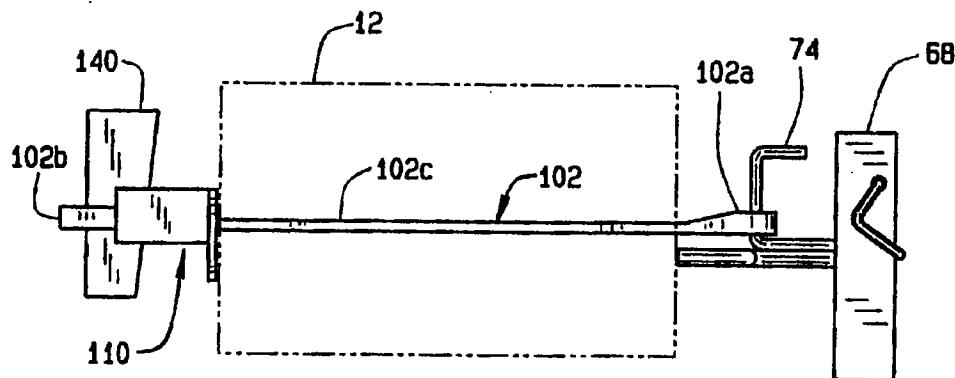


FIG. 19

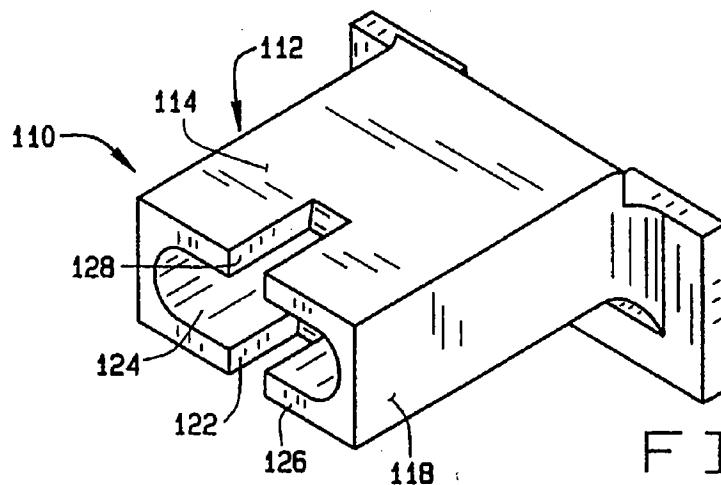


FIG. 19A

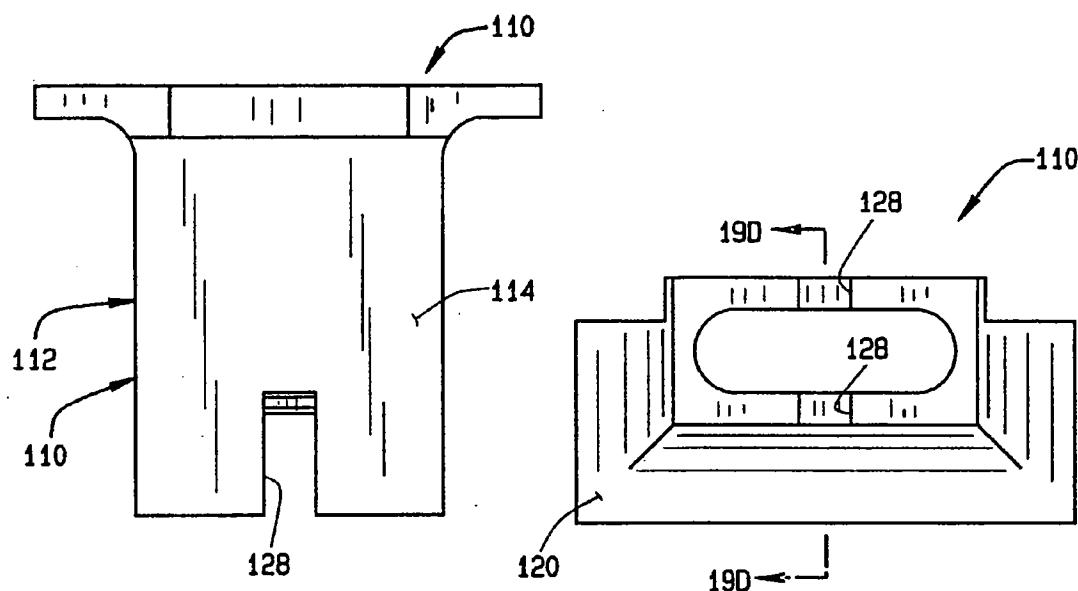


FIG. 19B

FIG. 19C

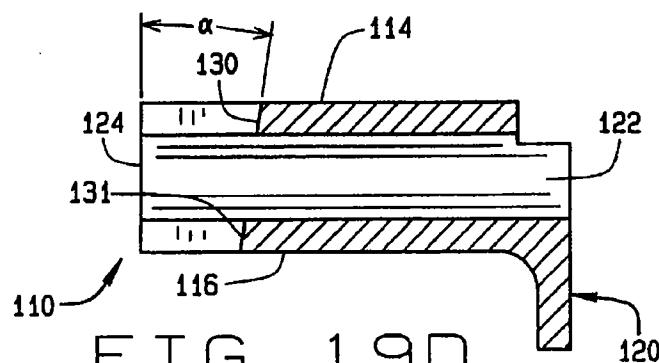


FIG. 19D

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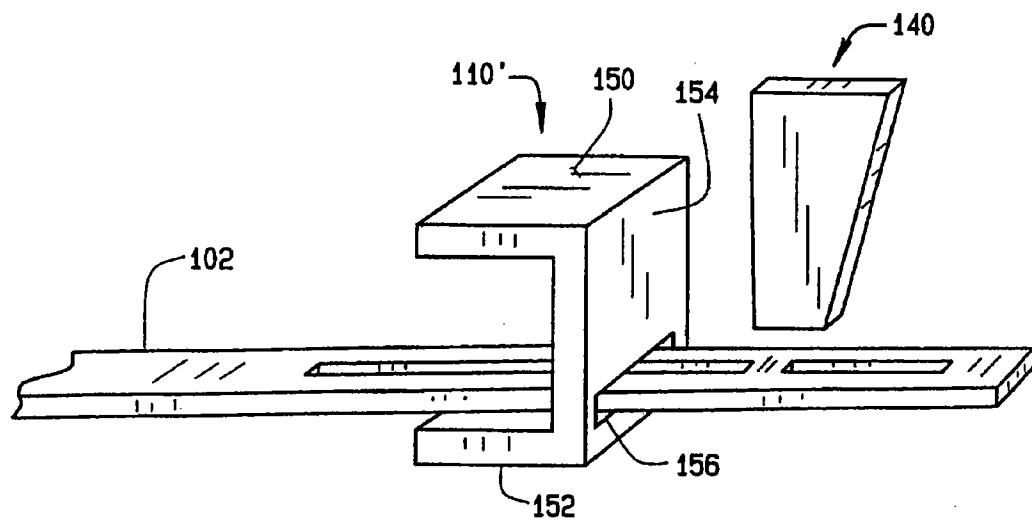


FIG. 20

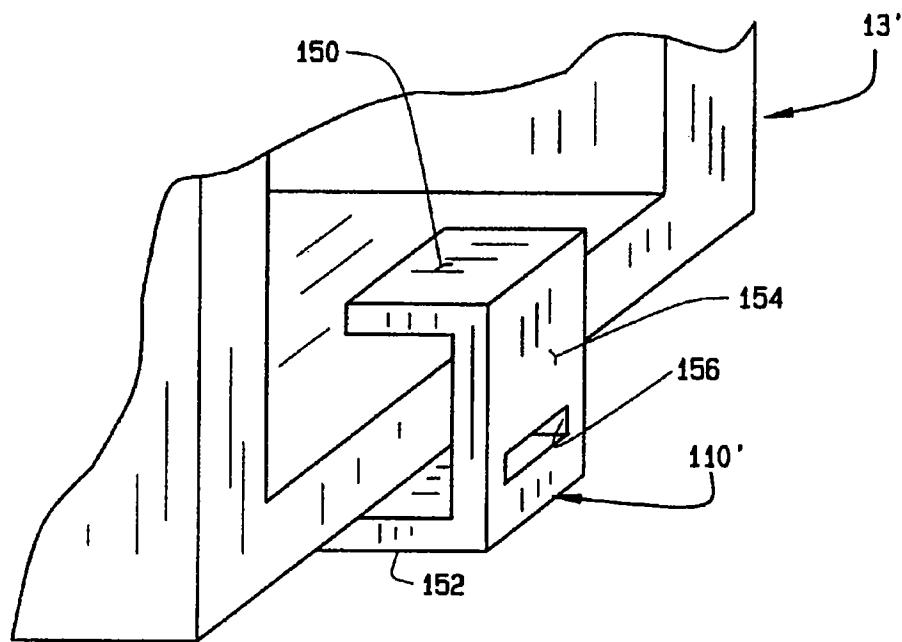


FIG. 21



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BORDEN LADNER GERVAIS LLP
World Exchange Plaza
1100 - 100 Queen Street
OTTAWA Ontario
K1P 1J9

Date : 2008/04/22

Classification :
E02D 29/02

AVIS D'ACCEPTATION/NOTICE OF ALLOWANCE

N° de demande/Application No. : 2,465,473

Date de dépôt/Filing date : 2004/04/27

Votre référence/
Your Reference : PAT 56940-1

Titre de l'invention/
Title of Invention : MODULAR RETAINING WALL FALL PROTECTION SYSTEM

Propriétaire(s)/Owner(s) : DUBBERT, PATRICK C.; BEST, MICHAEL; SCHMIDT, WADE; ROZIER, SCOTT

Revendications/Claims : 017

Examiné tel que modifié/
Examined as amended : 2007/12/07

La demande de brevet susmentionnée a été jugée acceptable.

Il faut acquitter la taxe finale de TROIS CENTS DOLLARS (300\$), ou CENT CINQUANTE DOLLARS (150\$) si le requérant a le droit de revendiquer le statut de petite entité et a soumis une déclaration de petite entité, dans les six mois suivant la date du présent avis. Faute de quoi la demande sera réputée abandonnée conformément à l'alinéa 73(1)f) de la Loi sur les brevets.

Une taxe additionnelle de six dollars (6\$) par page excédant 100 pages du mémoire descriptif et dessins devra aussi être payée.

Le brevet sera délivré au nom du dernier propriétaire inscrit à nos dossiers qui a fourni une documentation acceptable, au plus tard à la date du paiement de la taxe finale, conformément à l'article 41 des Règles sur les brevets.

La réponse au présent avis doit comprendre l'identification complète de la demande et la date de l'avis.

La publication des brevets canadiens délivrés dans la Gazette du Bureau des brevets peut comprendre aussi une note concernant la mise en vente d'un brevet ou de sa licence. Si vous désirez profiter de ce service gratuit, veuillez l'indiquer au moment de payer la taxe finale.

The above application for patent has been found allowable.

The final fee of THREE HUNDRED DOLLARS (\$300), or ONE HUNDRED AND FIFTY DOLLARS (\$150) where the applicant is entitled to claim small entity status and has submitted a small entity declaration, must be paid within six months following the date of this notice. Otherwise, the application will be deemed to be abandoned pursuant to paragraph 73(1)f) of the Patent Act.

An additional fee of six dollars (\$6.00) per page over 100 pages of specification and drawings must also be paid.

The patent shall issue to the last registered owner who has submitted acceptable documentation on or before the date that the final fee is paid (as pursuant to Section 41 of the Patent Rules).

A reply to this notice must include full identification of the application including the date of the notice.

The publication of issued Canadian patents in the Patent Office Record can also include an indication that the patent is available for licence or sale. If you wish to take advantage of this free service, please indicate this when paying the final fee.

Commissaire aux brevets/Commissioner for Patents

EXHIBIT

tabular

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June 18, 2007

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1100 - 100 Queen Street
OTTAWA Ontario
K1P 1J9

Application No. : **2,465,473**
Owner : DUBBERT, PATRICK C.; BEST, MICHAEL; SCHMIDT, WADE;
ROZIER, SCOTT
Title : **MODULAR RETAINING WALL FALL PROTECTION SYSTEM**
Classification : E02D 29/02 (2006.01)
Your File No. : **PAT 56940-1**
Examiner : Elizabeth Gojkovic

YOU ARE HEREBY NOTIFIED OF :

- A REQUISITION BY THE EXAMINER IN ACCORDANCE WITH SUBSECTION 30(2) OF THE *PATENT RULES*;
- A REQUISITION BY THE EXAMINER IN ACCORDANCE WITH SECTION 29 OF THE *PATENT RULES*.

IN ORDER TO AVOID MULTIPLE ABANDONMENTS UNDER PARAGRAPH 73(1)(A) OF THE *PATENT ACT*, A WRITTEN REPLY TO EACH REQUISITION MUST BE RECEIVED WITHIN 6 MONTHS AFTER THE ABOVE DATE.

This application has been examined as originally filed.

The number of claims in this application is 19.

The examiner has identified the following defects in the application:

The claims are directed to a plurality of alleged inventions as follows:

Group A - Claims 1-12 are directed to a retaining wall fall protection system comprising uprights, braces, and a stand-off assembly for spacing the protection system from the wall; and

Group B - Claims 13-19 are directed to an attachment assembly for securing an upright to a retaining wall using a strap.

EXHIBIT

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O P I C C I P O

The claims must be limited to one invention only as set out in section 36 of the *Patent Act*.

In view of the above, a search of the prior art and examination have been limited to the subject matter in claims 1-12 (Group A).

A search of the prior art, considering the above noted claims, has thus far failed to reveal any pertinent references.

The following defects are also noted:

Claims 1-6 are indefinite and do not comply with subsection 27(4) of the *Patent Act*. In the above claims, the term "upright" should read "uprights," "one of said uprights," or the like, as a plurality of uprights have been defined in claim 1 (line 3).

A statement in an application, such as found on page 1, line 4 which incorporates by reference any other document, does not comply with subsection 81(1) of the *Patent Rules*.

In accordance with subsection 81(2) of the *Patent Rules*, all documents referred to in the description of an application must be available to the public. Reference to the document on page 1, line 3 must be deleted or replaced by its corresponding patent number or publication number.

The description and drawings must be amended to comply with section 82 of the *Patent Rules*. The same reference character must be used for the same part throughout the application, and must not be used to designate different parts. On page 7, "back lip 14b" should read "back lip 14c." On page 8, "coupling pin holes 44" should read "coupling pin holes 42." In figure 5B, "14b" at the left side should be "14c" to agree with the description, as it points to the back lip.

In view of the foregoing defects, the applicant is requisitioned, under subsection 30(2) of the *Patent Rules*, to amend the application in order to comply with the *Patent Act* and the *Patent Rules* or to provide arguments as to why the application does comply.

Section 29 of the Patent Rules requisition

Under section 29 of the *Patent Rules*, the applicant is requisitioned to provide:

- an identification of any prior art cited in respect of the European Patent Office application describing the same invention on behalf of the applicant or on behalf of any other person claiming under an inventor named in the present application, and the patent number, if granted, under paragraphs 29(1)(a) and 29(1)(b) of the *Patent Rules*.
- alternatively, if the applicant did not apply for a patent in a foreign country, this must be stated.

To satisfy this requisition, applicant should provide all the preceding information or documents, or provide in accordance with subsection 29(3) of the *Patent Rules* a statement of reasons why any information or document is not available or known.

Elizabeth Gojkovic
Patent Examiner - Mech. VIII
819-934-3468

COPY

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IN THE CANADIAN PATENT OFFICE

Appln No.: 2,465,473

Class: E02D 29/02

Title: MODULAR RETAINING WALL FALL PROTECTION SYSTEM

Our File: PAT 56940-1

December 7, 2007

TO: The Commissioner of Patents, GATINEAU

Dear Sir

Responsive to the Office Action dated June 18, 2007, please amend this application by replacement of pages 2, 6, 7, 8, 9, 14 and 17 of the description and claims 1 to 19 by the new pages 2, 6, 7, 8, 9, 14 and 17 and claims 1 to 17 enclosed herewith. Please also replace the sheet of drawings containing Figure 5B by the new sheet enclosed herewith.

REMARKS

By the present amendments, applicant has revised the claims to address the Examiner's objection under section 36 of the *Patent Act*, it being noted that all of the claims now contain a common thread of inventive subject matter and are thereby linked in such a manner that section 36 is now satisfied.

The claims have also been revised to reflect amendments made during the corresponding U.S. prosecution and the revised language also addresses the Examiner's objection under subsection 27(4) to claims 1 to 6.

In the description, the informalities noted under subsection 81(2) and section 82 of the *Patent Rules* have been removed by appropriate amendment to both the description and drawings and, additionally, a number of editorial and grammatical improvements have been made at various locations in the description. Of course, no "new matter" has been added by the present amendments.

Finally, in response to the requisition under section 29 of the *Patent Rules*, please be advised that no corresponding European application was filed.

EXHIBIT

D

Should this application be abandoned for any reason, please regard this as the request(s) for reinstatement. Should the fees submitted with this letter be insufficient to cover all of the fees for which payment is explicitly or implicitly requested by this letter, or needed to reinstate the application, the Commissioner is authorized to charge the amount of the insufficiency to our deposit account number 600000247.

Yours very truly

Borden Ladner Gervais LLP / s.r.l.

L. BROOKE KENEFORD/jjp

By: L.B.K.

Agents

Encls.

1. Pages 2, 6, 7, 8, 9, 14 and 17
2. Claims 1 to 17
3. Sheet of drawings containing Figure 5B

MODULAR RETAINING WALL FALL PROTECTION SYSTEM

BACKGROUND OF THE INVENTION

[0003] The Occupational Safety and Health Administration requires that retaining walls being built over a specified height must use a retaining wall fall protection system to prevent those building the wall from being injured by a fall. However, no retaining wall fall protection systems exist which allow the retaining wall builder to quickly assemble and disassemble a protection system and be able to quickly change the configuration of the protection system to protect workers as the wall is being built. As such, there is a need for a retaining wall fall protection system of the present invention.

BRIEF SUMMARY OF THE INVENTION

[0004] The present invention comprises a retaining wall fall protection system comprising a plurality of base plates held in position by a retaining wall. It further includes a plurality of uprights pivotally attached to the base plates and a cross-brace attached to adjacent uprights at opposite ends of the cross-brace. A plurality of guardrails are provided and attached to guardrail adjustment brackets. The guardrail brackets are removably attachable to the uprights at various positions along the length of the uprights. Finally, there is provided an

[0025] FIG. 16 is a top plan view of a wall attachment assembly and standoff bracket in use with a curved retaining wall;

[0026] FIG. 17 is an exploded view of an alternative wall attachment assembly;

[0027] FIGS. 18 and 19 are top plan and side elevational views showing the wall attachment assembly of FIG. 17 mounted to a stand-off bracket and with a connecting strap extending through the retaining wall, the wall being shown in phantom;

[0028] FIGS. 19A-C are rear perspective, top plan, and front elevational views of a retainer for use with the attachment assembly of FIG. 17;

[0029] FIG. 19D is a cross-sectional view of the retainer taken along line 19D-19D of FIG. 19C;

[0030] FIG. 20 is a perspective view of an another alternative attachment assembly for use with an open-walled system; and

[0031] FIG. 21 is a perspective view showing the retainer of the attachment assembly of FIG. 20 mounted to a wall block.

[0032] Corresponding reference numerals will be used throughout the several figures of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0033] While the invention is susceptible of embodiment in many different forms, there is described in detail preferred embodiments of the invention. It is to be understood that the present disclosure is to be considered only as an example of the principles of the invention. This disclosure is not intended to limit the

broad aspect of the invention to the illustrated embodiments. The scope of protection should only be limited by the claims.

[0034] Referring to Figs. 1 and 2, the present invention comprises a fall protection system 10 for protecting workers while they are building a retaining wall 12 made from blocks 13. As will be apparent, the fall protection system 10 comprises a scaffolding system which, using brackets and attachment assemblies as described below, is secured to the wall 12. Upon completion of the wall 12, the scaffolding is removed from the wall.

[0035] The system 10 generally comprises base plates 14 each having an upright assembly 15 made from uprights 16 attached to the base plates 14. The adjacent uprights 16 are connected by cross-braces 18 and guardrails 20 which extend between the uprights 16. Referring to Figs. 4A and 4B, each upright 16 comprises a tube having several holes 22 formed therein. The upright 16 further comprises toggle studs 26.

[0036] Referring to Figs. 1, 2, 5A and 5B, base plates 14 are placed upon the ground and the retaining wall 12 is built upon a portion of the base plate 14 thus securing it in place. As seen, the base plate 14 has a bottom surface 14a and front and back lips 14b and 14c. The retaining wall block 13 rests against the back lip 14c. The base plate 14 has a length greater than the depth of the block and extends forwardly of the block. Hence, the front lip 14b is forward of the front surface of the wall blocks 13. The base plate 14 further includes a leveling screw 28 pivotally mounted to the base plate 14 to pivot in a plane generally perpendicular to the base plate 14. A leveling nut 30 is threadingly mounted on

the screw 28. The leveling nut 30 has first and second diameters 32, 34. The first diameter 32 is slightly smaller than the inside diameter of an end 24 of the upright 16 such that an upright 16 may be placed over the first diameter 32. The second diameter 34 is larger than an outside diameter of the upright 16 such that when the upright 16 is placed over the first diameter 32, it rests upon a shoulder 36 formed by the interface of the first diameter 32 and the second diameter 34. In this manner, the height of the upright 16 may be adjusted with respect to other uprights 16 by turning the leveling nut 30 with respect to the leveling screw 28 and the base plate 14.

[0037] Furthermore, referring to Figs. 4A-B and 6A-D, multiple uprights 16 may be attached at their ends to build longer upright assemblies 15 by placing a coupling tube 36 in the ends 24 of two uprights 16. The coupling tubes 36 comprise square tube that has been compressed at its ends 38 such that the tube is narrower in one dimension at its ends than it is at its center 40. For example, in Fig. 6C, a coupling tube 36 originally having a outside dimensions of 1.477 inches square, is compressed in one direction at its ends such that one outside dimension is reduced to 1.416 inches. However, the center 40 of the coupling tube 36 is compressed very little, if any, as shown in Fig. 6D. In this manner, coupling tubes 36 may be easily inserted into the ends 24 of the uprights 16 initially and provide an increasingly tighter fit as they are inserted farther in to the upright 16. The coupling tube 36 further includes a pair of coupling pin holes 42 and a spring pin hole 44. The coupling pin holes 42 align with holes 22 of the uprights such that gravity pins 46 (Fig. 7A-C) may be

inserted through the coupling tube 36 and the upright 16 to prevent them from becoming unattached. The spring pin hole 44 also aligns with a hole 22 of the upright 16 and has a spring loaded pin (not shown) disposed within the hole 44.

[0038] Referring to Figs. 7A-C, the gravity pin 46 comprises a rod bent into the configuration shown. The pin includes an L-shaped mounting section 46a having a portion 46c which extends through the holes 22 and 42 of the upright 16 and coupling tube 36, respectively, and a short leg 46d which extends generally perpendicularly from one end of the portion 46c. A U-shaped section 46b extends from an end of the short leg 46d and is in a plane perpendicular to the plane of the mounting section 46a. The U-shaped section 46b comprises a pair of short legs 46e,f joined by a section 46g. The U-shaped section leg 46e extends the mounting portion leg 46d. As best seen in FIG. 7C, the leg 46f is parallel to, and longer than, the leg 46e. Hence, the leg 46f crosses the plane of the mounting section 46a. The pin 46 is inserted into the upright 16 in the position shown in the bottom of FIGS. 7A and 7B and is allowed to drop by the force of gravity to the position shown in the top of FIGS. 7A and 7B. In the locked position, the U-shaped lock section extends around three sides of the upright 16 to prevent the pin 46 from being removed from the upright 16 without lifting the pin back to the "insert" position. As such, the pin 46 cannot accidentally be removed from the upright 16 by vibration or other accidental means.

[0039] A cross-brace 18 shown in FIG. 8 comprises two lengths of rod 48 joined at their centers by a pin 50. The rods 48 have flattened end

guardrail brackets 56 can be added as the wall increases in height. Additional wall attachment assemblies 76 are mounted to the uprights 16 as needed to ensure that the uprights are secured against the wall 12.

[0048] As can be seen from FIG. 3, the retaining wall fall protection system can be used with vertical retaining walls 12 as in FIG. 2 or with sloped retaining walls 12 as in FIG. 3 by virtue of the pivoting connection of the leveling screw 28 to the base plate 14.

[0049] When the wall is completed the protection system 10 can be disassembled and removed from the wall 12. All that will remain are the base plates 14 and the retainers 82 located between the back of the wall and the earth.

[0050] An alternative wall attachment assembly 100 is shown in FIGS. 17-19D. The attachment assembly 100 comprises an attachment strap 102 having an eyelet 104 at one end and a slot 106 at the opposite end. The eyelet 104 is sized to fit over the attachment dowel 74 of the bracket 67 or 67'. The strap 102 is preferably formed from a material so that it will be flexible. A preferred material is a plastic, such as nylon. The strap 102 has length sufficient to extend through the retaining wall 12 as seen in FIGS. 18A,B. The ends 102a,b of the strap 102, where the eyelet 104 and slot 106, respectively, are located, is thicker than the center section 102c of the strap.

[0051] The attachment assembly also includes a retainer 110 (FIGS. 19A-D), which is provided to be positioned on the back side of the retaining wall to receive the strap 102. The retainer 110 includes a body 112 having a top surface 114, bottom surface 116, and side surfaces 118. A front face 120 is formed at the

[0054] The retainer 110 is designed for use with a closed wall system. An alternative retainer 110' (FIGS. 20-21) is provided to enable the attachment system 100 to be used with an open wall system. As is known, in a closed wall system, the front faces of the blocks are solid, to provide a solid or uninterrupted front surface to the wall. In an open wall system, on the other hand, the blocks 13' are open along their front and back faces, and may even be open along their top surfaces. Hence, blocks 13' can be in the form of a tube or can be generally U-shaped. As is known, an open wall system allows for vegetation to be planted in the openings on the wall. The retainer 110' is in the form of a C-channel having top and bottom surfaces 150 and 152 and a back wall 154. A slot 156 through which the strap 102 can pass is formed at the bottom of the back wall 154. The back wall 154 is sized such that the inner surface of the back wall (i.e., the distance from the bottom of the top surface 150 to the top of the bottom surface 152 is greater than the width of the block wall, as seen in FIG. 21). Hence, a gap will be formed between the bottom of the block and the top of the retainer bottom surface 152. This gap is sized to allow the strap 102 to pass between the block retainer bottom surface and through the retainer slot 156. The retainer 110' is otherwise used substantially in the same was as the retainer 110, as described above.

[0055] After the wall 12 has been constructed, the scaffolding is removed from the wall. As can be appreciated, the straps 102 pass through the wall, and cannot be completely removed from the wall. Rather, the strap is cut off as close as possible to the wall, so that the strap will not be visible. The strap is

CLAIMS:

1. A retaining wall fall protection system comprising:
a frame comprised of a plurality of base plates; a plurality of uprights each connectable to a base plate; and cross-braces and/or guard rails mountable between adjacent uprights;
at least two stand-off assemblies; each of said at least two stand-off assemblies being mounted to one of said uprights and having a stand-off leg adapted to maintain a predetermined distance between the retaining wall and said uprights; and
an attachment assembly attachable to the stand-off assembly and adapted to engage the retaining wall to temporarily fix said frame to the retaining wall; said attachment assembly comprising a flexible attachment strap and a retainer; said attachment strap having a first end and a second end; said attachment strap being connected at said first end to said stand-off assembly; said attachment strap being sized to extend through said wall; said retainer engaging said attachment strap on a side of said wall opposite said frame to place a tensile stress on said attachment strap, thereby pulling said stand-off assembly, and hence said frame, against said wall, thereby securing said frame in place relative to said wall.
2. The retaining wall fall protection system of claim 1 further comprising a leveling adjustment screw pivotally attached to each base plate and having a leveling adjustment nut threaded thereon for supporting one of said uprights, each said leveling adjustment nut receiving a bottom end of said upright.
3. The retaining wall fall protection system of claim 1 comprising a coupling tube for connecting segments to form an upright of a desired height; said coupling tube having a width, a height, and a length; the width of said coupling tube being smaller at opposite ends of said coupling tube than at a middle of said coupling tube.
4. The retaining wall fall protection system of claim 1 comprising a guardrail bracket mountable between a pair of adjacent uprights, said guardrails being mountable to said guardrail brackets.
5. The retaining wall fall protection system of claim 4 wherein each said guardrail bracket comprises a base mountable to the upright associated therewith and at least one

toggle pin extending from the guardrail bracket base; said guardrail comprising an opening at at least one end thereof which is sized to fit over said toggle.

6. The retaining wall fall protection system of claim 1 wherein the stand-off assembly comprises a base adapted to be secured to each of the uprights to which the stand-off assembly is mounted, said stand-off leg extending from said base, and an attachment dowel extending from said base; said stand-off leg engaging the wall without being secured to the wall when the frame is erected adjacent the wall;

said attachment assembly comprising an attachment strap having a first end and a second end; an eyelet in said first end sized and shaped to fit over said stand-off assembly attachment dowel.

7. The retaining wall fall protection system of claim 6 wherein said retainer cooperating with said attachment strap to urge a surface of said retainer against a back surface of said retaining wall.

8. The retaining wall fall protection system of claim 7 wherein said attachment strap includes a slot at its said second end; said retainer comprising a body comprising a top surface, a bottom surface, a front face surface adapted to engage said retaining wall, and an opening in said front face surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge engaging a surface of said retainer and an edge of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall.

9. The retaining wall fall protection system of claim 8 wherein said retainer body is generally elongate and comprises a back surface spaced from said front surface by said top and bottom surfaces; an opening in said back surface sized to allow said strap to pass therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

10. The retaining wall fall protection system of claim 9 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

11. The retaining wall fall protection system of claim 8 wherein the block used to construct the wall is an open block having a horizontal surface extending between side surfaces; the retainer body being generally C-shaped and comprising an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said retainer front face; said back wall having a height greater than the width of said block horizontal surface; said front face opening being positioned adjacent said retainer bottom surface.
12. An attachment assembly for securing an upright of a scaffolding system to a retaining wall comprised of a plurality of retaining wall blocks; the attachment assembly comprising:
 - a stand-off bracket mountable to said upright; said stand-off bracket assembly comprising a base adapted to be secured to said upright, a stand-off leg extending from said base and an attachment dowel extending from said base; said leg engaging the retaining wall in use to maintain the frame a determined distance from the wall;
 - a flexible attachment strap having a first end and a second end and being of a length sufficient to pass through said wall; an eyelet in said first end sized and shaped to fit over said stand-off assembly attachment dowel; said attachment strap including a slot at its said second end;
 - a retainer; said retainer comprising a body comprising a top surface, a bottom surface, a block engaging surface adapted to engage said retaining wall during use, and an opening in said block engaging surface; said retainer body opening being sized to allow said attachment strap to pass therethrough; said retainer further including a wedge which is sized and shaped to be received in said attachment strap slot; said wedge having a first side edge which engages a surface of said retainer and a second side edge which engages a surface of said attachment strap slot distal from said retainer surface to urge said retainer against said retaining wall; said retainer cooperating with said attachment strap to pull said stand-off assembly toward said retainer, thereby urging a surface of said retainer and said stand-off against opposite sides of said retaining wall to secure the frame in position relative to the retaining wall.
13. The attachment assembly of claim 12 wherein said retainer body is generally elongate and comprises a back surface spaced from said block engaging surface by said top and bottom surfaces; an opening in said back surface sized to allow said strap to pass

therethrough; and aligned slots in said upper and lower surfaces of said retainer; said wedge passing through said slots and engaging a forward surface of said slots.

14. The attachment assembly of claim 13 wherein said retainer body slot forward surfaces are sloped; the slope of the slot surfaces corresponding generally to the slope of the wedge edges.

15. The attachment assembly of claim 12 wherein said retainer is generally C-shaped and comprises an upper surface, a lower surface and a back wall; the forward surface of said back wall defining said block engaging surface; said back wall having a height greater than the width of said block horizontal surface; said opening being positioned adjacent said retainer bottom surface.

16. A retaining wall fall protection system comprising:

a frame comprised of a plurality of base plates; a plurality of uprights each connectable to one of the base plates; and cross-braces and/or guard rails mountable between adjacent uprights;

at least two stand-off assemblies; each of said at least two stand-off assemblies being mounted to one of said uprights and having a stand-off leg adapted to maintain a predetermined distance between the retaining wall and said uprights during use; and

an attachment assembly attachable to the stand-off assembly and adapted to engage the retaining wall to temporarily fix said upright to the retaining wall; said attachment assembly comprising:

a flexible attachment strap having a first end and a second end; said strap being adapted at said first end to be removably connected to said stand-off assembly; said attachment strap being of a length sufficient to pass through said wall; said attachment strap including a slot at its said second end;

a retainer; said retainer comprising a body having a block engaging surface adapted to engage said retaining wall, an opening in said block engaging surface, opposed first and second surfaces extending from said block engaging surface, and aligned slots extending inwardly from a back of said surfaces, said slots being opened at said back surface of said back of said surfaces; said retainer body opening being sized to allow said attachment strap to pass therethrough; and

a wedge sized and shaped to be received in said attachment strap slot and said slots of said retainer surfaces; said wedge having a first side edge which engages an inner surface of said retainer slots and a second side edge which engages a surface of said attachment strap slot distal from said retainer surface, whereby, said wedge cooperates with said attachment strap to pull said stand-off assembly and said retainer against opposite sides of said retaining wall to secure said frame in position relative to said retaining wall.

17. The retaining wall fall protection system of claim 3 wherein said coupling tube and said uprights have openings which pass therethrough, the holes of the coupling tube being aligned with the holes in the uprights; said fall protection system further comprising a gravity pin; the gravity pin comprising an L-shaped mounting portion and a generally U-shaped portion;

said mounting portion comprising a first leg and a second leg; said first leg being sized and shaped to extend through the aligned holes of the upright and coupling tube such that such gravity pin can rotate relative to said uprights; said second leg extending generally perpendicularly from an end of said first leg;

said U-shaped portion extending from an end of the mounting portion second leg and being in a plane generally perpendicular to the plane of the mounting portion; said U-shaped portion comprising a pair of short legs joined by a member;

said gravity pin being rotatable relative to the upright between a raised position in which the mounting portion first leg can be passed through or removed from the aligned holes of the upright associated therewith and the coupling tube and a lowered position in which the U-shaped section member rests against said upright and said U-shaped section legs extend along opposite sides of the upright to prevent the gravity pin mounting section first leg from exiting said aligned holes of the upright and coupling tube.

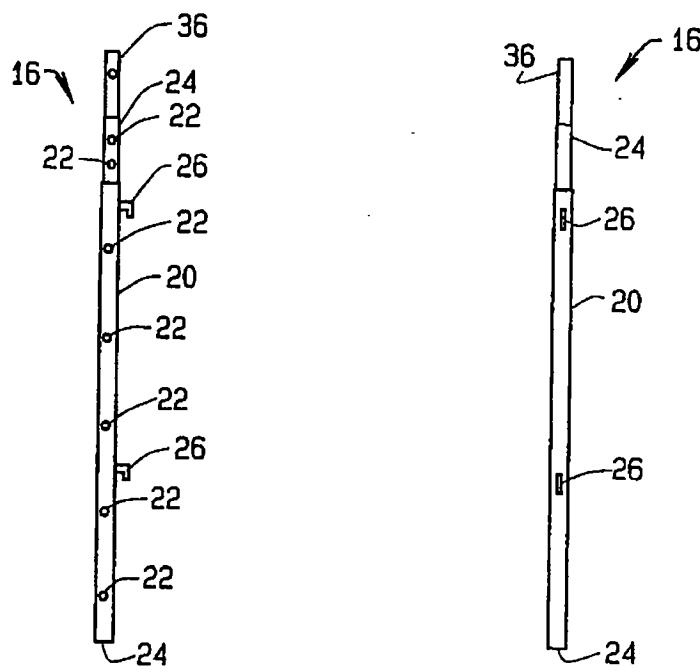


FIG. 4A

FIG. 4B

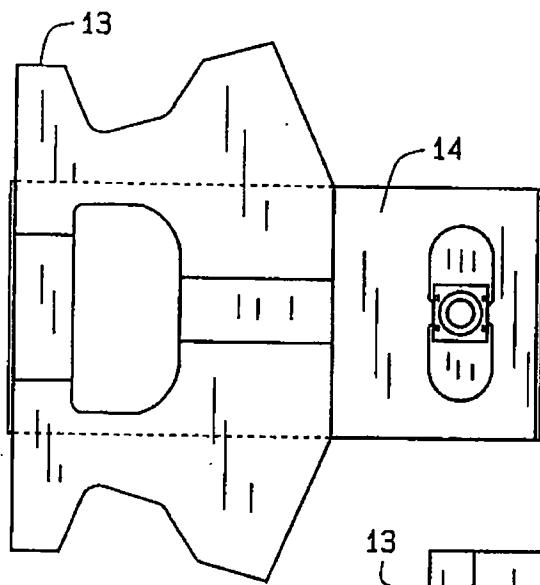


FIG. 5A

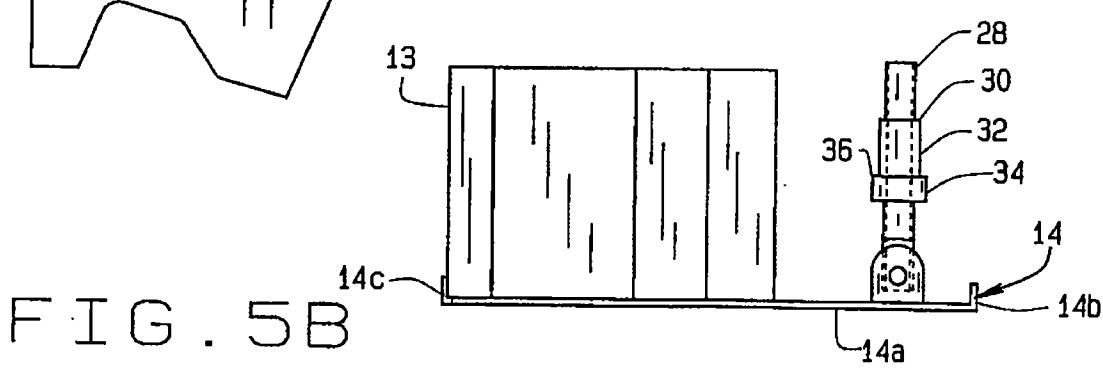


FIG. 5B